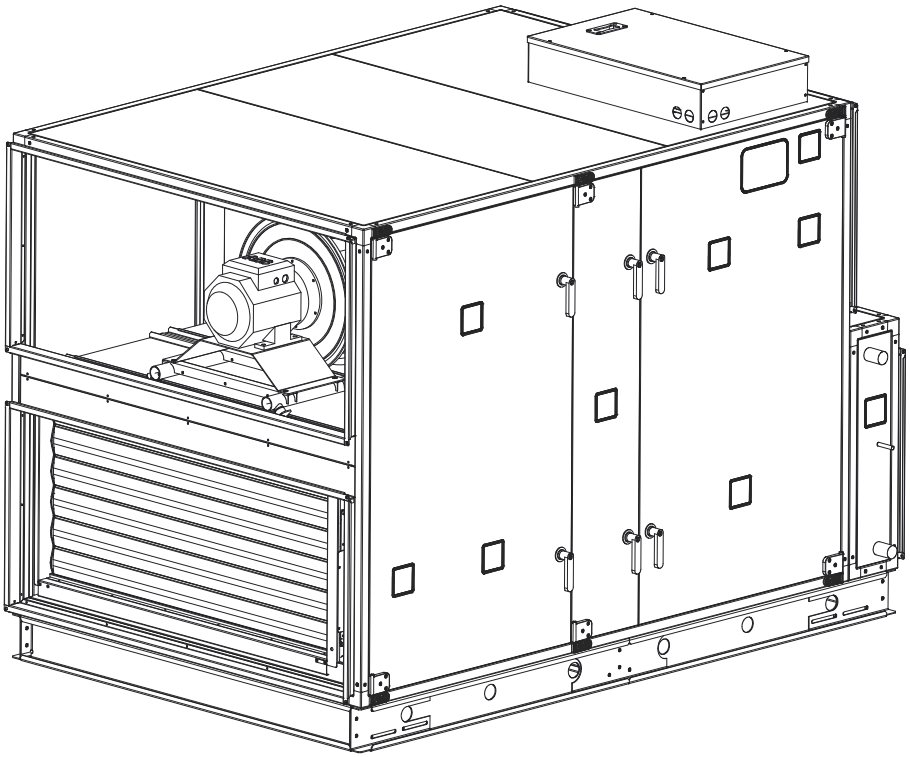
July 2014

Air Handling Units

Danvent DV, Danvent TIME

With control system



GB User Manual

Version 1.01.04

Master version for translated User Manuals

Original version for this air handling unit

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a. Manufacturer

This User Manual covers all air handling units with control system delivered by Systemair A/S.

Manufacturer and supplier data:
Systemair A/S
Ved Milepælen 7
DK-8361 Hasselager

Responsible for documentation: Ulf Bang

b. Name of machines

This manual is about Systemair air handling units with control systems called DANVENT DV10, DANVENT DV15, DANVENT DV20, DANVENT DV25, DANVENT DV30, DANVENT DV40, DANVENT DV50, DANVENT DV60, DANVENT DV80, DANVENT DV100, DANVENT DV120, DANVENT DV150, DANVENT DV190 og DANVENT DV240.

and

TIMEec 10, TIMEec 15, TIMEec 20, TIMEec 25, TIMEec 30, TIMEec 40

c. Declaration of Conformity - example

The manufacturer:

Systemair A/S
Ved Milepælen 7
DK - 8361 Hasselager

Hereby declares that, air handling units of the flowing types:

Delivered with control system
DANVENT DV10, DANVENT DV15, DANVENT DV20, DANVENT DV25, DANVENT DV30, DANVENT DV40, DANVENT DV50, DANVENT DV60, DANVENT DV80, DANVENT DV100, DANVENT DV120, DANVENT DV150, DANVENT DV190 and DANVENT DV240.

TIMEec 10, TIMEec 15, TIMEec 20, TIMEec 25, TIMEec 30, TIMEec 40

Serial No: ”YYMM-71800-X”

are manufactured and delivered in accordance with following directives:

Machinery directive	2006/42/EC
EMC – directive	2004/108/EC
Low voltage directive	2006/95/EC
Pressure equipment directive	97/23/EC
European Standard	EN378

Equipment type: **DVU-series**
Consisting of: Compressor, evaporator and condenser

Verification and Assessment by:
Notified Body Bureau VERITAS CE0041 for PED
Bureau VERITAS UK, “Parklands”, Wilmslow Road
Didsbury, Manchester M20 2RE

Module: A1
Certificate no: CE-0041-PED-A1-SYA-001-10-DNK

The declaration is only valid, if the installation of the air handling unit is carried out according to the instructions delivered with the unit. The installer will be responsible for the CE marking and documentation, if any construction or functional changes are applied to the air handling unit.

Hasselager 24. June 2013

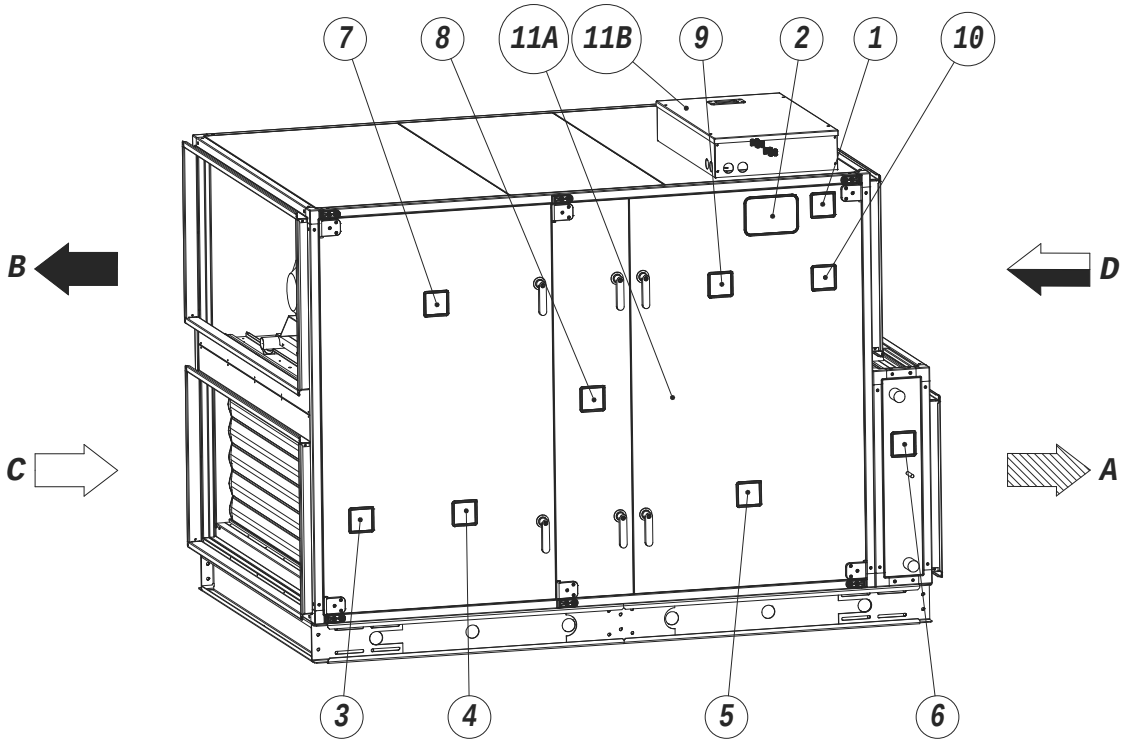
CE

d. General descriptions, dangers and warnings

TIME and DV air handling units are order specific machines available in thousands of different configurations. Only a few examples of machine configurations are described below.
The air handling units are intended for the transport and treatment of air between -40 °C and + 40 °C
The units are exclusively for comfort ventilation.
Maintenance of the units must be carried out by skilled technicians.
On the drawing below, a right hand unit is shown because the inspection doors are mounted on the right hand side of the unit when looked in direction of SUPPLY airflow. The unit below is with rotary heat exchanger.

Position	Description	Symbol
A	Connection, supply air (to the rooms)	
B	Connection, exhaust air	
C	Connection, outdoor air in	
D	Connection, extract air (from the rooms)	

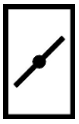
d.1 Overview via pictograms on the inspection side of the unit



This is a right hand unit because the inspection doors are mounted on the right hand side of the unit when looked in direction of SUPPLY airflow.

d.1.1 Where are pictograms placed on the units

Example (Symbols and descriptions of functions for fast identification)

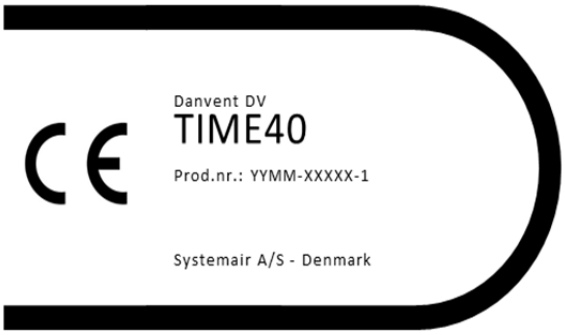
Position	Description	Symbol
1	The CE label and the unique production number of this machine	
2	Machine card	
3	Damper - supply air	
4	Filter - supply air	
5	Fan- supply air	
6	Heating battery - supply air	
7	Fan - extract air	
8	Rotary heat exchanger	
9	Filter – extract air	
10	Damper – extract air	
11A	3 labels. One label with Flowchart, one label with terminal plan for external components and one label listing data about the cabinet. The labels are placed behind inspection doors, if the cabinet with control system is inside the unit.	
11B	3 labels. One label with Flowchart, one label with terminal plan for external components and one label listing data about the cabinet. The labels are placed on the cover of the cabinet, if the cabinet with control system is placed on the top of or on the front of the unit.	

d.1.2 CE label – example for DV unit

This is the mandatory informations for the CE marking with; Product name (in this example Danvent DV 20, where 20 informs about the size of the unit), Production number for the complete unit (in this example YYMM-xxxxx-x, where YYMM informs about year and month for the manufacture), xxxxx-x is the unique production number.

d.1.3 CE label – example for TIME unit

This is the mandatory informations for the CE marking with;
Product name (in this example TIME 40, where 40 informs about the size of the unit), Production number for the complete unit (in this example YYMM-xxxxx-1, where YYMM informs about year and month for the manufacture), xxxxx-1 is the unique production number.



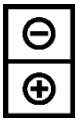
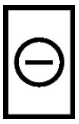
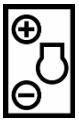
d.1.4 Pictogram on a door for a fan in a DV unit

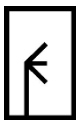
Example of the pictogram with the symbol for the function - fan, Systemair product name is DVE-20-BK where 20 informs about the size of the unit and BK is Backward Curved fan blades, production number for the complete unit (in this example 73004-2) and the customer's name for the unit, always written after – Plant no:_____

d.1.5 Pictogram on a door for a fan in a TIME unit

Example of the pictogram with the symbol for the function - fan, Systemair product name is this example is - Fan Supply, production number for the complete unit (in this example xxxxx-1) and the customer's name for the unit, always written after - Plant no:_____

d.1.6 Pictograms for all available functions in the units

Id	Description	Symbol
DVA	Damper	
DVB	Damper	
DVM	Damper for mixing	
DVP	Damper for mixing	
DVG	Panel filter	
DVF	Bag filter	
DVC	Rotary heat exchanger	
DVQ	Plate heat exchanger (cross flow and counter flow)	
DVR	Run around heat exchanger	
DVH	Heating battery	
DVK	Cooling battery	
DVU	Integrated cooling with compressor unit	

DVE	Plug fan	
DVD	Silencer	
DVX	Humidifier	

d.1.7 Pictograms about warnings and dangers on the units

Pictograms according to EN1886 about

Warning about danger by rotating parts

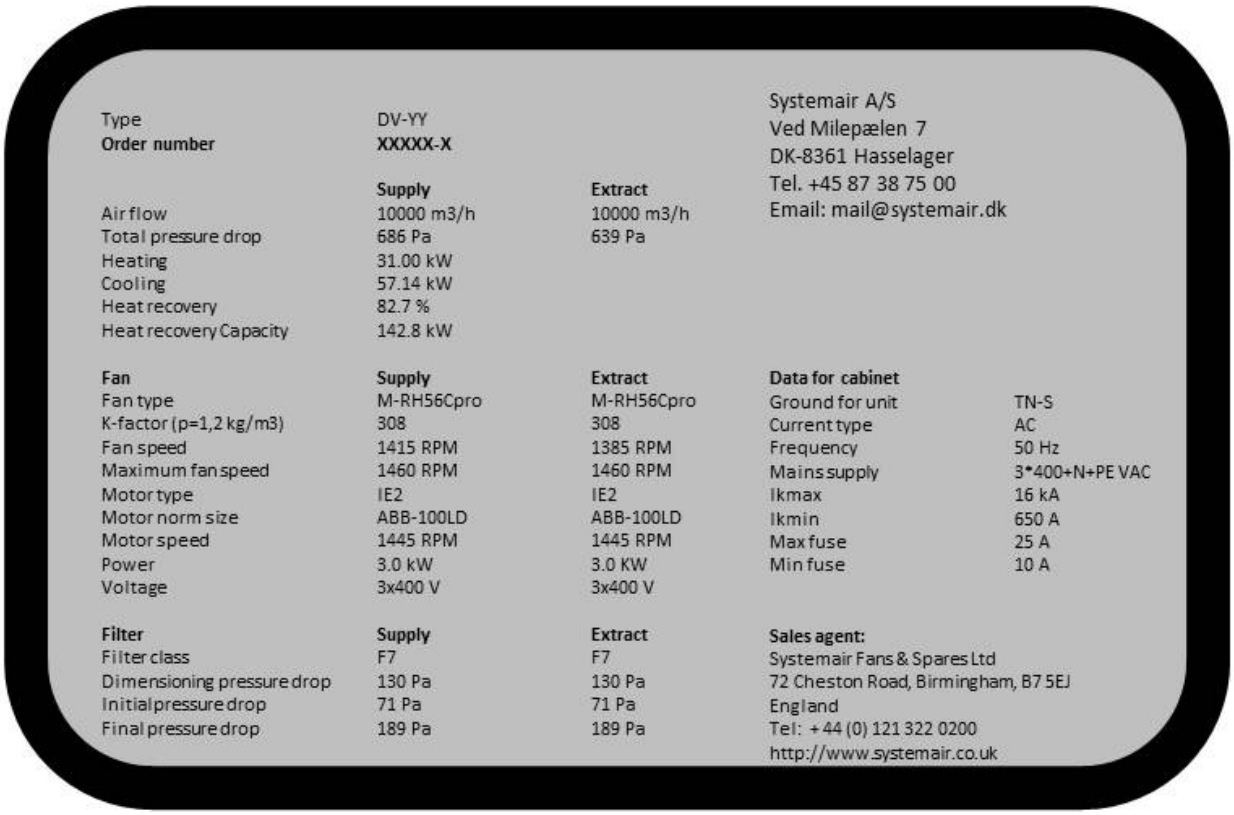
Warning about danger by electricity

Warning about danger by heat

d.2 Data about the unit according to cards and labels in and on the unit

d.2.1 Machine card with unique data on every unit

An example of a machine card is shown below.



Type	DV-YY	
Order number	**XXXXX-X**	
	Supply	**Extract**
Air flow	10000 m3/h	10000 m3/h
Total pressure drop	686 Pa	639 Pa
Heating	31.00 kW	
Cooling	57.14 kW	
Heat recovery	82.7 %	
Heat recovery Capacity	142.8 kW	

Fan	**Supply**	**Extract**
Fan type	M-RH56Cpro	M-RH56Cpro
K-factor (p=1,2 kg/m3)	308	308
Fan speed	1415 RPM	1385 RPM
Maximum fan speed	1460 RPM	1460 RPM
Motor type	IE2	IE2
Motor norm size	ABB-100LD	ABB-100LD
Motor speed	1445 RPM	1445 RPM
Power	3.0 kW	3.0 KW
Voltage	3x400 V	3x400 V

Filter	**Supply**	**Extract**
Filter class	F7	F7
Dimensioning pressure drop	130 Pa	130 Pa
Initial pressure drop	71 Pa	71 Pa
Final pressure drop	189 Pa	189 Pa

Systemair A/S
Ved Milepælen 7
DK-8361 Hasselager
Tel. +45 87 38 75 00
Email: mail@systemair.dk

Data for cabinet	
Ground for unit	TN-S
Current type	AC
Frequency	50 Hz
Mains supply	3*400+N+PE VAC
Ikmax	16 kA
Ikmin	650 A
Max fuse	25 A
Min fuse	10 A

Sales agent:
Systemair Fans & Spares Ltd
72 Cheston Road, Birmingham, B7 5EJ
England
Tel: +44 (0) 121 322 0200
http://www.systemair.co.uk

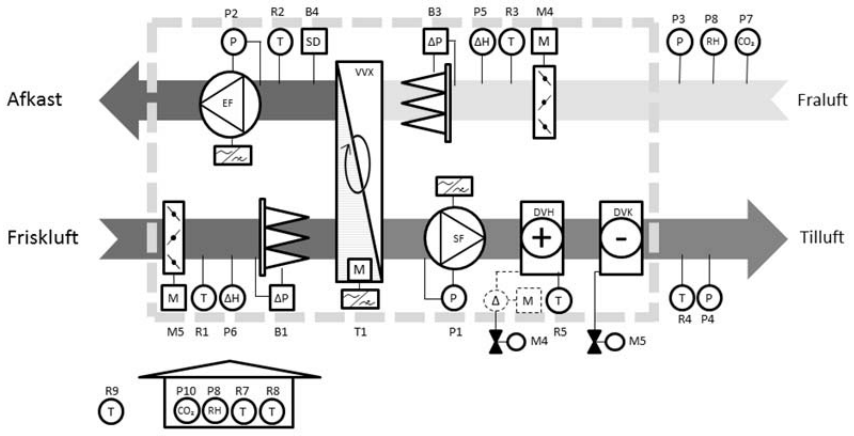
d.2.2 Label with data about the cabinet

An example of the label that is always placed on or with the cabinet

Systemair A/S

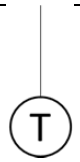
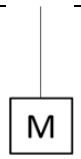
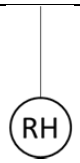
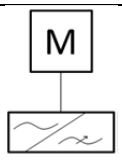
Systemair declares hereby that the cabinet is in conformity with:	
SBB Low voltage panels:	N60439-1
Electrical material on machines:	EN60204-1
EMC-directive environment:	89/336/EOF
Diagram version	DV ver. 2.11
Systemair order number	72800-1
Unit size	DV 10-150
Cabinet data:	
System ground	TN-S
Current type	AC
Frequence	50 HZ
Rated voltage	3*400 V+N+PE VAC
Control voltage	24 VDC
IK max	6 kA
IK min	650 A
Max fuse	25
Min fuse	10
Cable colors:	
Protection circuit	Green/yellow
230 VAC phase	Black
0 VAC neutral	Blue
24 VDC	Grey
0 VDC	Grey
Analog/digital	Grey

d.2.3 Flowchart – example of the label placed on or with the cabinet



Ordre nr. XXXXX-X
Aggregat: Danvent DV 15

d.2.4 Symbols in the flowchart and explanation about the symbols.

Id	Description	Symbol
RX	Temperature sensor - PT1000	
MX	Damper motor - on/off	
MX	Damper motor – 0-10V	
BX	Filter guard - digital	
PX	Pressure transmitter – 0-10V	
PX	Sensor for relative humidity – 0-10V	
PX	Sensor for CO_2 – 0-10V	
T110	Controller for rotary heat exchanger – 0-10V	

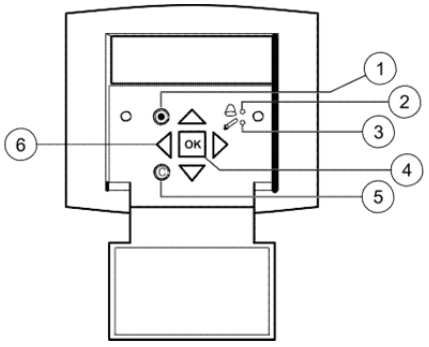
d.2.5 Example of label placed on or with the cabinet – Terminal plan for external components

Product Description	Product Terminal	Cable	Wire	Switchboard Terminal
Main power		W1000	L1	X1:L1
			L2	X1:L2
			L3	X1:L3
			N	X1:N
			G/G	X1:PE
M15	L	W100	1	X2:3
	N		2	X2:4
	PE		G/G	PE
Reduced speed / Stop unit		W380	1	X3:10
			2	X3:11
Normal speed / Start unit		W381	1	X3:12
			2	X3:13
Ext. Fire signal				X3:13
				X3:15
R4		W311	1	X3:20
			2	X3:21
R9		W363	1	X3:22
			2	X3:23
R5		W314	1	X3:23
			2	X3:24
P4	24V	W340	1	X3:25
	0-10V		2	X3:26
	ANG		3	X3:27
P8	24V	W354	1	X3:29
	0-10V		2	X3:30
	ANG		3	X3:31
P3	24V	W341	1	X3:32
	0-10V		2	X3:30
	ANG		3	X3:31

Product Description	Product Terminal	Cable	Wire	Switchboard Terminal
M6	ANG	W320	1	X3:42
	24V		2	X3:43
	0-10V		3	X3:41
M7	ANG	W321	1	X3:42
	24V		2	X3:43
	0-10V		3	X3:44
Repeater	EO-R 1G	W90	1	X3:45
	EO-R 2GO		2	X3:46
Heating active	"NO"			X3:48
				X3:49
Alarm signal	"NO"			K4:11
				K4:14
Operating signal	"NO"			K8:21
				K8:24
Changeover signal	"NO"			X5:11
				X5:12
Rec. Signal	"NO"			X5:13
				X5:14
P9	24V	W353	1	X5:14
	0-10V		2	X5:16
	ANG		3	X5:15
R7		W360	1	X5:21
			2	X5:22
R8		W361	1	X5:23
			2	X5:24
Circulation pump start				X5:32
				X5:34

d.3 Hand terminal (optional for DV units – always standard for TIME units)

The hand terminal is delivered in a cardboard box containing the other external components. This cardboard box is usually, but not always, placed in the section with the supply air fan. The Operator's Guide for the hand terminal is the annex 17 attached to this – User Manual.



1. ALARM: Press for alarm list
2. Alarm LED – red light for alarm
3. LED indicating change of parameters
4. OK/ENTER
5. Press for clear
6. Press for move of curser in menu

Important! All LEDs on the hand terminal must be off before startup of the unit.

d.4 Dimensions of the units – selected examples.

Examples on dimensions of selected configurations below. Other configurations have other dimensions.

Extract air ⬅ Supply air ➡

Rotary Heat Exchanger		Unit size													
		10	15	20	25	30	40	50	60	80	100	120	150	190	240
Standard	Width	970	1120	1270	1420	1570	1720	2020	2170	2170	2370	2590	2890	3190	3490
Rotary Heat Exchanger	Width	-	-	-	-	-	-	-	-	2320	2520	2890	3040	3720	4020
Single height unit	Height*	520	595	670	745	820	895	1045	1120	1270	1420	1570	1720	2170	2470
Double height unit	Height*	970	1120	1270	1420	1570	1720	2020	2240	2540	2840	3140	3440	4340	4940
C1E	Length	2160	2160	2460	2460	2760	3060	2910	3280	3210	3960	4260	4560	5010	5530
	Weight kg	430	520	660	760	920	1100	1470	1980	2140	2630	3250	3990	6290	7610
C2E	Length	2910	2910	3210	3210	3510	3810	3660	4030	4030	4930	5230	5530	5980	6430
	Weight kg	500	610	770	870	1080	1270	1690	2250	2470	3050	3890	4690	7220	8600
C3E	Length	2680	2680	3130	3130	3430	3880	4030	4400	4400	5450	5900	6200	6430	7100
	Weight kg	480	580	730	810	1010	1220	1700	2230	2480	3160	3870	4660	6870	8280
C4E	Length	3430	3430	3880	3880	4180	4630	4780	5220	5220	6420	7020	7170	7400	8000
	Weight kg	560	660	840	930	1180	1390	1930	2560	2830	3610	4560	5320	7790	9180
C5E	Length	2680	2680	3130	3130	3430	3880	3730	4100	4100	5080	5380	5680	6430	7100
	Weight kg	480	570	720	800	1010	1220	1630	2120	2330	2970	3620	4390	6860	8280
C6E	Length	3430	3430	3880	3880	4180	4630	4480	4850	4850	6050	6350	6650	7400	8000
	Weight kg	550	660	840	920	1180	1380	1850	2410	2670	3370	4280	5060	7790	9170

Extract air ⬅ Supply air ➡

Plate Heat Exchanger		Unit size													
		10	15	20	25	30	40	50	60	80	100	120	150	190	240
	Width	970	1120	1270	1420	1570	1720	2020	2170	2170	2370	2590	2890	-	-
Single height unit	Height*	520	595	670	745	820	895	1045	1120	1270	1420	1570	1720	-	-
Double height unit	Height*	970	1120	1270	1420	1570	1720	2020	2240	2540	2840	3140	3440	-	-
Q1E	Length	3210	3580	4030	4330	4780	5080	5230	5460	5230	5910	6960	7260	-	-
	Weight kg	570	760	940	1130	1370	1640	2300	2550	2610	3210	4200	5130	-	-
Q2E	Length	3960	4330	4780	5080	5530	5830	5980	6210	5980	6880	7930	8230	-	-
	Weight kg	660	850	1060	1260	1540	1810	2520	2880	2910	3660	4870	5790	-	-
Q3E	Length	3800	4100	4700	5000	5450	5900	6050	6280	6280	7330	8380	8680	-	-
	Weight kg	650	820	1030	1140	1470	1760	2480	2720	2840	3620	4600	5550	-	-
Q4E	Length	4550	4850	5450	5750	6200	6650	6800	7030	6800	8000	9050	9350	-	-
	Weight kg	720	900	1140	1310	1630	1930	2720	3030	3130	3980	5150	6130	-	-
Q5E	Length	3800	4100	4700	5000	5450	5900	6050	6280	6130	7030	8080	8680	-	-
	Weight kg	640	810	1020	1170	1480	1750	2460	2700	2890	3690	4690	5840	-	-
Q6E	Length	4550	4850	5450	5750	6200	6650	6800	7100	6800	8000	9050	9350	-	-
	Weight kg	720	900	1140	1300	1620	1920	2700	3030	3200	4120	5320	6380	-	-

* DV 10-150 : Height excl. base frame DVZ. DV 190-240 : Height incl. base frame.

d.5 Ordinary automatically operation – only manual operation by new parameters.

The unit is operating fully automatically and manual operation includes only selection of new parameters via the buttons on the hand terminal. The hand terminal is connected by a cable to the controller in the cabinet. 10 meters of cable is delivered with the unit and the customer has the possibility to replace this cable with an identical type of cable that is up to 100 meters long. The alternative is that the controller is connected to a BMS system with the ability to select new parameters via PC, tablet, SmartPhone or mobile phone.

d.6 Warnings about dangers

Pictograms are according to EN1886 about;

Warning about danger by rotating parts

Warning about danger by electricity

Warning about danger by heat

Disregards of instructions shown on warning signs are connected by risk for injury or damage on material.

e. Drawings, diagrams, guides and instructions for the use, maintenance and repair

All DV units with integrated control system and TIME units are manufactured in compliance with the EC Declaration of Conformity and they are CE marked as machines. Unique Declaration with production number of the machine is an integral part of the machine – enclosed as annex 1 to this manual. If the buyer carries out changes or adds components in or on the machine, the buyer must issue a new EC Declaration of Conformity and a new CE marking of the machine. To promote correct use of the machines, the below-mentioned instructions are an integral part of the machine:

- Unique drawings, data and description of functions for the delivered unit – annex 2
- Wiring diagrams – annex 16

- Operator's Guide – annex 17
- Instructions for use of the machine – section k in this manual
- Instructions about adjustment and maintenance – section r in this manual
- Safety during adjustment and maintenance – section s

f. Employees in charge of operation/control/maintenance

The unit is able to operate fully automatically when the installer has started, adjusted and handed over the faultless unit to the staff that takes care of operation, control and maintenance.

f1. Employees that take care of ordinary operation

Indications of operation status as well as indication of faults are visible in the display and on the LED's of the hand terminal. The employees can enter new parameters in the controller via the buttons on the hand terminal. The alternative is that the controller is connected to a BMS system with the ability to select new parameters via PC, tablet, SmartPhone or mobile phone.

g. Intended use and range of applications

The air handling units are intended for the transport and treatment of air between -40 °C and + 40 °C
The units are exclusively for comfort ventilation and not for air that causes severe corrosion to galvanized steel and to copper and aluminum. The units are not for environments that exceed the corrosion class C4 according to EN ISO 12944-2.
Intended applications for the units are:
Offices, teaching rooms, hotels, shops, homes and similar comfort zones.

h. Unintended use and misuse – inappropriate applications for the machine

The air handling units are not suitable for transport of air with risk of explosion and with Ex-Classification. Do not install the units in Ex-areas at all.
Do not install units outdoors unless the units are constructed for outdoor installation. Units not suitable for outdoor installation are units without roof and units with cabinet installed on the unit (the cabinet is installed inside the unit for outdoor installation).
The units are not for environments that exceed the corrosion class C4 according to EN ISO 12944-2, and the units are not for transport of solid particles.
Not intended applications for the units are:
Kitchen extraction, swimming pools, off-shore, Ex-areas, drying of washed clothes.
Do not use the unit with partly finished duct systems. Do not use the unit for ventilation of the building site until the unit is properly provided with guards.

h.1 Air handling unit in operation

The pressure difference between interior and exterior of the unit must not exceed 2000 Pa for the DV 10 and up to DV 150 (including DV 150), and 1500 Pa for DV 190 and DV 240.
Before start-up of the unit all ducts, guards and all protective devices must be mounted to prevent any access to rotating fan impellers. All inspection doors must be closed and locked when the unit is in operation.
Do not use the unit without filters.

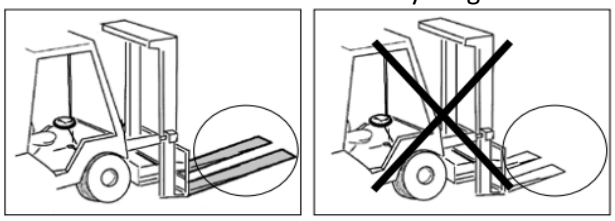
i. Instructions for unloading on the site as well as installation and connection

i.1. Unloading on the site

The air handling unit – AHU - is delivered as one section or in several sections, which are to be assembled on site. The AHU is delivered on transport pallets, legs or on a base frame. Loading and unloading as well as transport on the site is possible by fork-lift truck or by crane using suitable lifting straps.

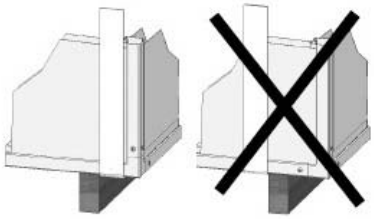
i.1.1 Unloading by fork-lift truck

The forks of the truck must be sufficiently long to avoid any damage to the AHU underside.

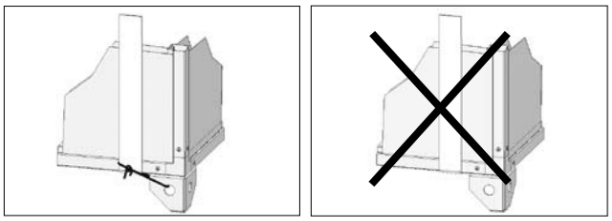


i.1.2 Unloading by crane

AHU delivered on transport pallet must be lifted by straps as shown in the illustration.



AHU delivered with legs must be lifted by straps secured to the legs as shown in the illustration.



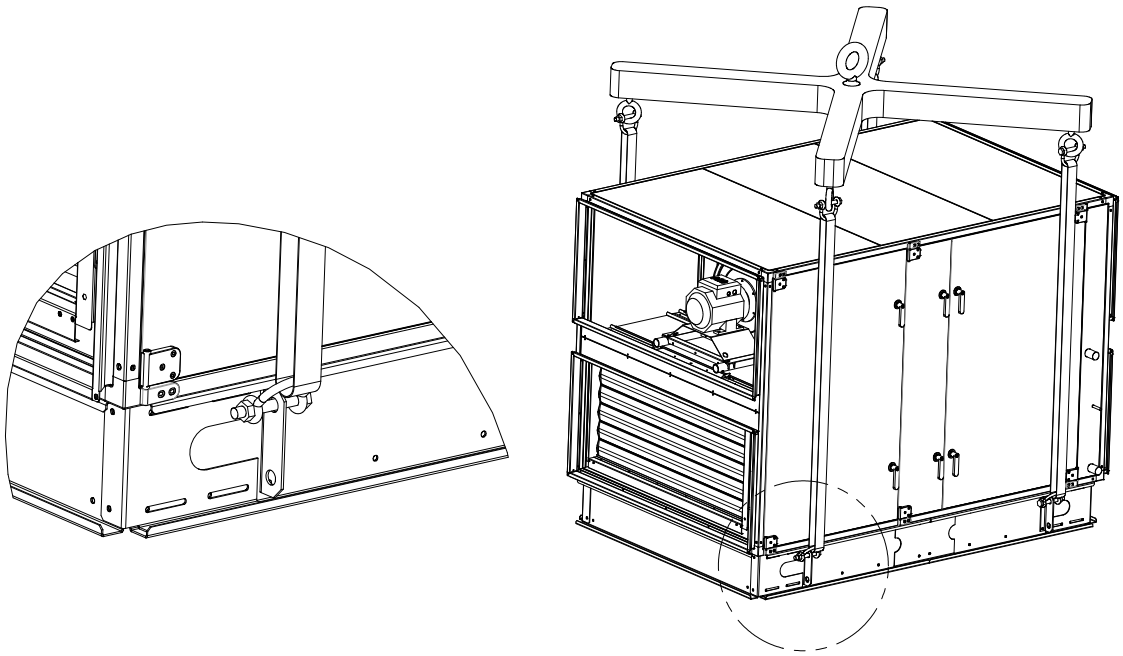
i.1.3 Transport of unit without base frame on the site

Units without base frame are always delivered in sections with each section on a pallet. Sections can be transported on the site by hand manual forklifts.

i.1.4 Lifting a unit with straps

Use an appropriate lifting beam with a sufficient span to avoid that the straps touch and damage the drip nose profiles and the inspection side with handles, pipes and accessories – for example manometers, cabinets, tabs for measuring the pressure.

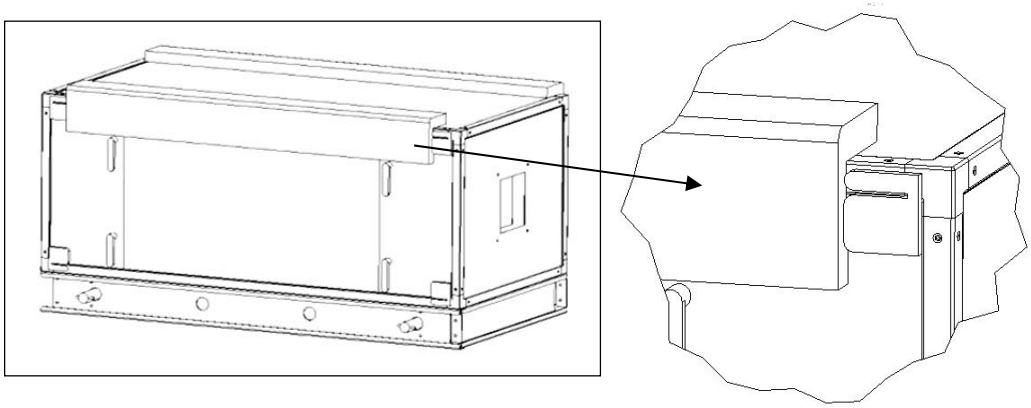
i.1.5 Lifting a unit with preinstalled brackets on the base frame for lifting.



Lifting beam and straps are not included in the delivery.

i.1.6 Roof unit with bitumen roof

Avoid damaging the drip nose profiles along the bitumen roof. Keep the protection profiles of Styrofoam on the unit until the installation has been completed. If the unit is lifted by straps, the straps must be kept away from the drip nose profiles by bars to avoid damage to roofing profiles.



i.1.7 Roof unit with steel roof

For units with steel plate roof, the steel plates are delivered uninstalled on a separate pallet. Do **not** step or walk on the plates.

.

i.1.8 Pre-assembly storage

The AHU must be protected from the weather and accidental impact. Plastic packaging **must** be removed and the unit covered with tarpaulin or similar materials. In order to minimize condensation, sufficient air circulation must be ensured between the covering and the unit.

i.1.9 Tilt less than 30˚ during transportation of the section with cooling compressor – DVU or DVU-C

During transportation, the unit section - DVU or DVU-C- **must** always be in the upright position or tilted less than 30˚. If it is necessary to tilt the unit more than 30˚, the suction pipe of the compressor must point upwards to prevent the escape of oil from the compressor sump.

i.2. Installation - mechanical

i.2.1 Free area in front of and above the unit

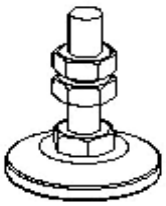
Important! When positioning the unit on the site, it must be ensured that an area with the same width as the unit is kept free for service and inspection and also for replacement of fans and exchanger, if needed. The width of the free area must be at least 900 mm.
Important! For safe access to the cabinet with electrical components, if the cabinet is placed on top of the unit, the free area from the upper edge of the cabinet to the ceiling must be at least 700 mm.

i.2.2 Supporting surface

The surface beneath the unit must be level, horizontal and vibration-free. The surface must be able to withstand the load of the AHU. Weights of the sections are written in Annex 2.
Remember! Duct work must be sound insulated and must not be mounted directly on beams, trusses or other critical building parts.

i.2.3 Adjustable feet under legs or base frame and transport of sections

Adjustable feet are provided in a carton box placed inside the unit. Adjustable feet are delivered for indoor units and not for outdoor units.



Sections can be transported on the site by hand manual forklifts or similar. The frame profiles in the edges of the sections have carrying capacity for lifting by the hand manual forklifts.

i.2.4 Base frame assembly

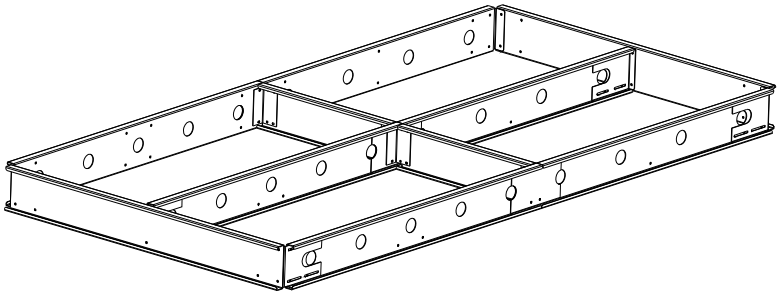
The base frame is delivered unassembled and has to be assembled on the site before it is possible to position and assemble the various sections of the AHU. Assembly of the base frame is illustrated on 4 pages in a manual that is always in a plastic folder and is attached to one of the large base frame parts. This manual is available on the site among the base frame parts.
There are two types of base frames:

1. 150 mm high base frames
2. 250 mm high base frames

There are 4 different manuals and each of them illustrates the assembly of the 4 different types of base frames:

1. Manual about the 150 mm high base frames for AHUs in the sizes from DV 10 to DV 40. The name of this manual is – **Base frame 150 DVZ 10 - 40**
2. Manual about the 150 mm high base frames for AHUs in the sizes from DV 50 to DV 150. The name of the manual is – **Base frame 150 DVZ 50 - 150**
3. Manual about the 250 mm high base frames for AHUs in the sizes from DV 10 to DV 40. The name of the manual is – **Base frame 250 DVZ 10 - 40**
4. Manual about the 250 mm high base frames for AHUs in the sizes from DV 50 to DV 150. The name of the manual is – **Base frame 250 DVZ 50 - 150**

Example of 150 mm high base frame for AHUs in the size from DV 50 to DV 150



Mount adjustable feet with a distance of maximum 1500 mm between each foot under the base frame. The base frame can now be levelled by the adjustable feet. The next step is to place and assemble AHU sections on the base frame.

i.2.5 Base frames for outdoor units

Outdoor units must be installed on 250 mm high base frames and are always fitted to the AHU sections. Hot-dip galvanized base frames are recommended for outdoor units. Systemair delivers these base frames without the above mentioned adjustable feet.

i.2.6 Installation on the site of unit sections at the base frame when sections are delivered on pallets.

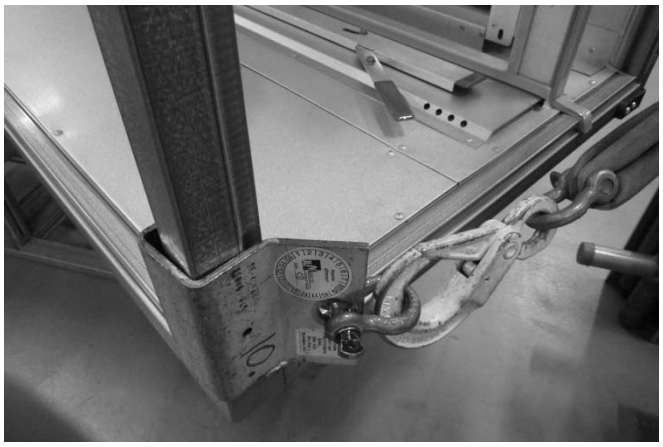
Lift up the section by hand manual forklifts to the level where the underside of the section is even with the overside of the base frame.

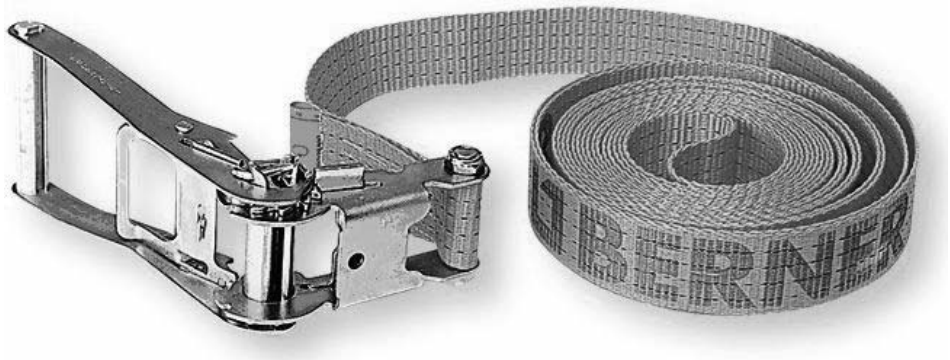
1. Pull the section to the correct position on the base frame by lifting straps – it is maybe necessary to support the section by heavy duty furniture trolleys (see the photos below)

Example of heavy duty furniture trolley turned with the wheels upwards. Placed in this way on the forks of the hand manual forklifts the heavy duty furniture trolleys are suitable for safe and careful rolling of the unit sections over to the base frames.

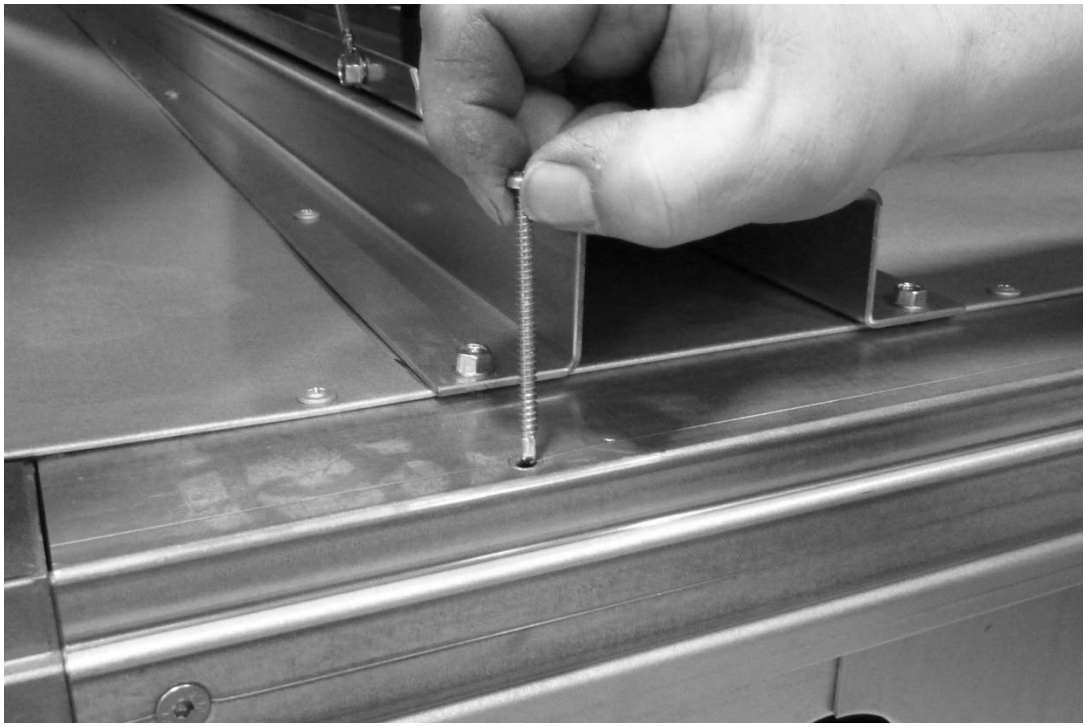
Example of very heavy duty furniture trolleys. Turned with the wheels upwards and placed on the forks of hand manual forklifts these heavy duty furniture trolleys are very suitable for safe and careful rolling of the unit sections over to the base frames.

2. Pull sections together with lifting straps. We recommend the below shown type of brackets because this type is not damaging the frame profiles of the units. An example of lifting straps is shown below.





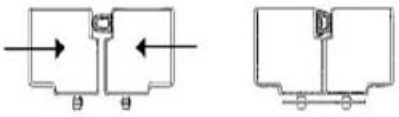
3. Sections are mounted to base frames with long self-drilling screws. The frame profile under the inspection doors is placed over the horizontal profile of the base frame. See the example on the photo below.



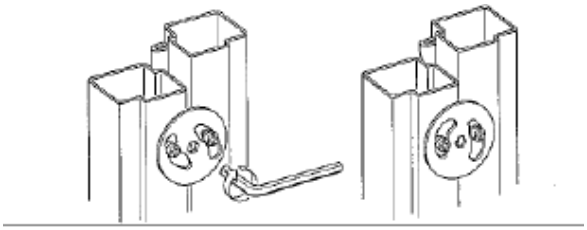
i.2.7 Joining the AHU sections

The sections must be placed on the base frame and if the unit is delivered with 100 mm legs, the sections must be positioned directly opposite each other.

1. Ensure that the internal factory-fitted rubber sealing is undamaged
2. The sections are then to be positioned directly opposite each other. If the sections are built with legs, the adjustable feet can be used to get the sections parallel and at the same height.
3. Press the sections hard together so that the rubber profiles are so flat that the iron frames of the two sections are joined. Straps with tensioner as shown below are suitable for pressing the sections hard together.



4. The sections are then to be locked permanently together with the black plastic-coated Systemair Disc-Locks. The Disc-Locks are delivered in a carton box placed inside the unit. Place each Disc-Lock over the 2 factory fitted locking pins. The discs and locking pins are not reliable for pulling the sections together. They are only sufficient for keeping the sections well together, so just turn each disc gently with the supplied Allen key. Use a sequence where each disc is tightened with only one click at a time. If the unit is placed too close to a wall with no space left for the mounting of Systemair Disc-Locks, brackets must be placed inside the unit to keep the sections permanently together (brackets for this purpose are not delivered by Systemair)



i.2.8 Fitting the ductwork

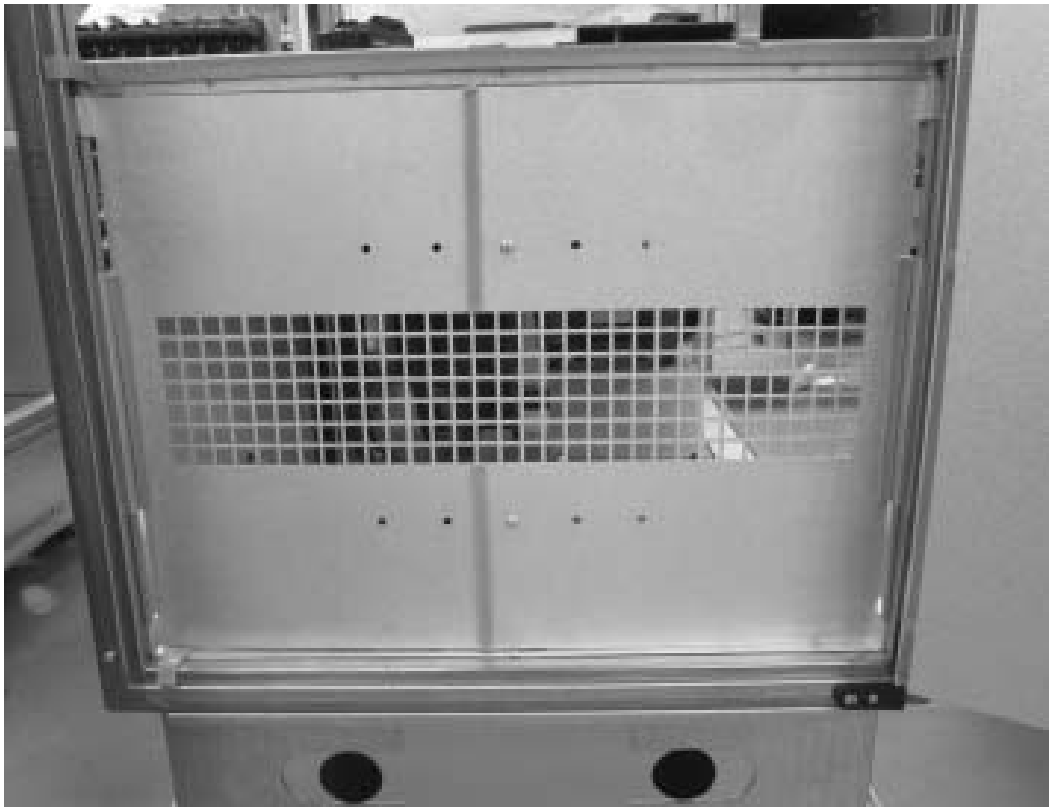
Flexible duct connections between AHU and ductwork must always be installed. Be sure that flexible duct connections are almost fully stretched. (Flexible connections are ordered as accessories and they are placed inside the unit). At the fan outlet on a centrifugal fan, the duct size should be as close to the outlet size as possible. Avoid blockage and turbulence at the fan outlet.

i.2.9 Risk of stack effect by vertical ducts and wind pressure on louvers

On special occasions stack effect – also called chimney effect – in the ducts create airflows that drives the impellers by turned off motors.
A rotating impeller is a potential hazard during cleaning and maintenance of the unit.
Eliminate this airflow by dampers with spring return motors for automatic closing of the dampers - even by power failure.
Important! The Systemair air handling units can be ordered and delivered without dampers, and the installer/user must check that duct systems with the described risk of stack effect (chimney effect) will be provided with dampers and spring return motors.

i.2.10 Refitting of guards

The guard is a safety guard installed inside the door. Tools are necessary for the removal of the guard. If the guard has been demounted during the installation on the site, the guard must be refitted before startup of the unit.



Insert the edges of the guard in the frame profile in the groove that is in the frame profile, and connect both parts of the guard at the middle with 2 screws.
Replace the vibration damping foam rubber list if it is damaged.

i.3. Installation - electrical

i.3.1 Description

The position of components is shown and described in annex 2.
Connections to terminals are shown in the wiring diagram – annex 16.
When control of constant pressure in the ducts (also called demand controlled capacity) is required, the pressure transmitters must measure in the duct system at places where all pressure changes can be registered accurately for reliable pressure control. This placement is left to the customer's free choice.
It is important to achieve a constant pressure – also for the most faraway diffusers.

i.3.2 Wiring diagrams

The wiring diagrams are printed in separate manuals delivered with the units as annex 16.
The wiring diagrams are not unique for the order specific units, but it is standard wiring diagrams with data about all configurations of the units. Hereby the wiring diagrams will inform about components that are not ordered and delivered. See the order confirmation and annex 2 with exact information about the accessory components that are ordered and delivered.
The wiring diagram includes:
General description, Circuit diagrams, Cabinet layout, Terminal matrix and Cable plan.
The wiring diagrams are on the DVD delivered with every unit.

i.3.2.1 TIME units - labels on the cabinet next to the supply fan

- Label with data about the cabinet – including data about fuses – see section d.2.2
- Flowchart – see section d.2.3 – standard and not unique for the order specific unit
- Label with terminal plan for external components – see section d.2.5 – standard, and not unique for the order specific unit

i.3.2.2 DV units – labels on or with the cabinet

- Label with data about the cabinet – including data about fuses – see section d.2.2
- Flowchart – see section d.2.3 – unique for the order specific unit – printed with the unique production number of the unit
- Label with terminal plan for external components – see section d.2.5 – standard, and not unique for the order specific unit

i.3.3 Installation of mains power supply

An AC/DC residual current device must be installed in the power supply. The power supply for the units is 3*400 V + N + PE - 50 Hz. Protection of the units in accordance with the local statutory requirements for the additional protection of systems with frequency converters.

i.3.3.1 Necessary mains power supply for TIME units with ec motors and without DVU

Necessary mains power supply in the table below and in the wiring diagram in annex 16. This information is also printed on the unique machine card placed on the front of every unit (see example of a machine card in section d.2.1).

Unit	Motor	Fuse Minimum	Fuse Maximum	Maximum Short-circuit current
TIME 10	2*0.94 kW 2*0.99 kW	10A	16A	16kA
TIME 15	2*0.99 kW 2*1.7 kW	10A 13A	25A	16kA
TIME 20	2*1.7 kW 2*3.0 kW	13A	25A	16kA
TIME 25	2*3.0 kW 2*2.73 kW	13A 13A	25A	16kA
TIME 30	2*2.73 kW 2*5.18 kW	20A	32A	16kA
TIME 40	2*5.18 kW 2*4.7 kW	20A 20A	32A	16kA

i.3.3.2 Necessary mains power supply for DV units with cabinet/control system

Necessary mains power supply is printed on the unique machine card placed on the front of every unit (see example of a machine card in section d.2.1).

i.3.3.3 Necessary overvoltage protection device, that leads lightning overvoltage to an earth lead on a safe way.

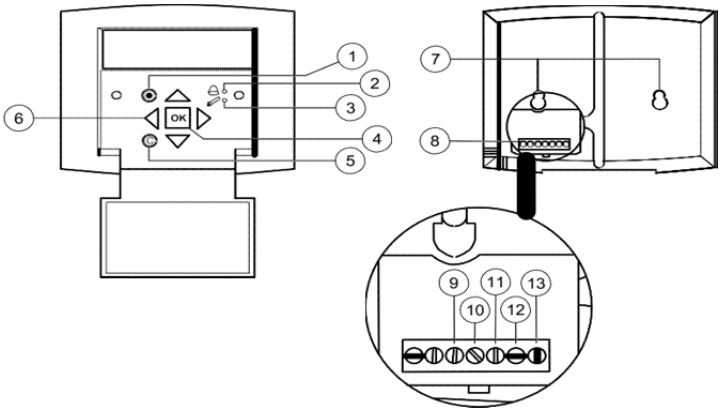
The Installer and user must be aware of the fact that lightning strikes make a risk that requires installation of overvoltage protection devices to lead the lightning overvoltage to an earth lead in a safe way. Installer and user must take care of this according to local statutory requirements.

i.3.4 Electrical connection of components and functions

External components and functions are delivered according to the order confirmation. Cable number's are written on the cables, on the label with terminal plan on or with the cabinet – see section d.2.5 and in the wiring diagrams – annex 16.

i.3.4.1 Connection of the Systemair Control Panel to the Corrigo E28 controller – software version 3.3

The SCP panel – part number S-208997 for software version 3.3 - is provided with 10 metres of cable and a socket for connection with the controller inside the cabinet. The cable is not pulled through the cable entry in the cabinet, so demount the cable at the back of the Systemair Control Panel - pull the cable through the cable entry in the cabinet - adjust the length of the cable and remount the cable in the panel, or add more cable – up to 100 m of cable between the Systemair Control Panel and the controller is possible. Place the Systemair Control Panel on the outer side of the unit or on a wall.



Position	Description
1	Alarm button: Press for alarm list.
2	Alarm indicator: Flashing for unacknowledged alarm.
3	Write enable LED: Slow flashing indicates parameters can be changed.
4	OK button: Press to activate a selected menu/setting, if possible.
5	Button for clear: Abort a parameter setting or – if possible - restore the original value.
6	Right/left – and up/down buttons: Used for navigation up and down and to the right and left in the menu tree. Up/down buttons are also used for increasing or decreasing values of parameters.
7	Holes for mounting
8	Terminal block
9	No cable on terminal 5 for software version 3.3 (illustrated with number 9 on the above drawing)
10	Brown cable on terminal 4 for software version 3.3 (illustrated with number 10 on the above drawing)
11	Yellow cable on terminal 3 for software version 3.3 (illustrated with number 11 on the above drawing)
12	White cable on terminal 2 for software version 3.3 (illustrated with number 12 on the above drawing)
13	Black cable on terminal 1 for software version 3.3 (illustrated with number 13 on the above drawing)

i.4 Installation – Pipes for water – hot and chilled, valves and drains

i.4.1 Description

If ordered with the unit, the valves and valve motors are stored in a carton box placed inside the unit. Water trap(s) – standard or optional - is (are) necessary to ensure escape of water from the tray under plate heat exchanger and (or) cooling coil. Water trap(s) is (are) stored in a carton box placed inside the unit.

i.4.2 Pipe connections

Connection pipes on heating- and cooling coils are provided with external thread. Drainage outlets on drip trays are provided with external thread.

i.4.3 Possibility of extracting components from the unit

Pipes and cables must not obstruct the inspection doors and components which can be extracted from the unit. Potential components for extraction are filters, fans and rotary heat exchanger.

i.4.4 Pipe connections to batteries

i.4.4.1 Heating coils

Pipes for hot water must be protected by insulation against frost and loss of heat. Further protection against frost can be obtained by installing electrical heating wires around the pipes and under the insulation combined with temperature sensors and a control system. Pipes, insulation, electrical heating wires, control system for heating wires and circulation pump are not delivered by Systemair.

i.4.4.2 Cooling coils

If ordered with the unit, the valves and valve motors are stored in a carton box placed inside the unit. Pipes for cooling must be protected by insulation against condensation on the pipes and loss of cooling in the summer. Pipes and insulation are not delivered by Systemair.

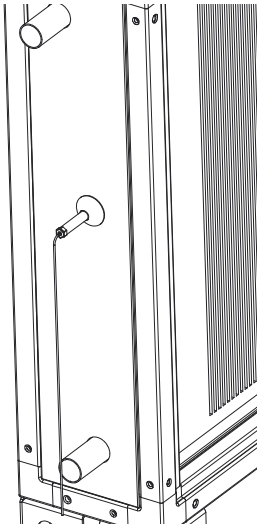
i.4.4.3 Rigid bearings for valves, circulation pumps and pipe system

The coil and pipes from the coil are not constructed to withstand the weight and stress from valves, circulation pumps, long pipes and insulation of pipes. The system must be supported carefully in rigid bearings to roof, floor and walls.

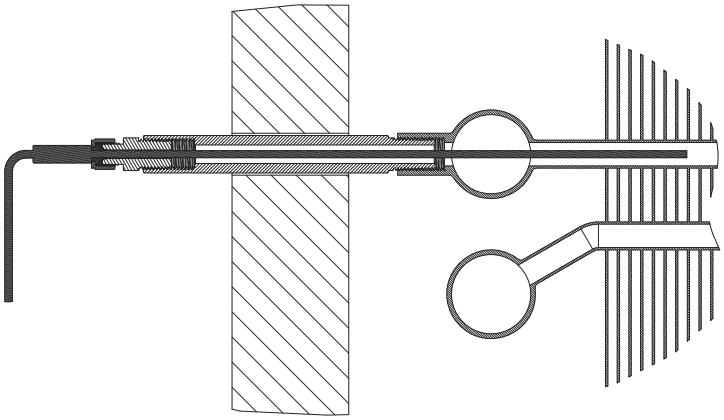
i.4.4.3.1 Pipe connection to heating coils

The heating capacity of the coil with only 2 rows is independent of the connection of the hot water in equal flow or in counter flow to the direction of the air, but connection of the hot water to the pipe marked for inlet and the return water to the pipe marked for outlet is very important to ensure that the sensor for transmission of the water temperature really will be placed in a return circuit of the coil (Screw-joint for the water temperature sensor is welded in the main collection pipe for return water).
For the frost protection of heating coil, the water temperature in the coil is transmitted to the controller The controller always generates a signal to the valve motor that keeps a sufficient flow of hot water to protect the coil against frost. This frost protection is also activated when the running mode is “off”.
Coils with 3 rows or more must always be connected in counter flow to the airflow.
NOTE: If glycol is added, the glycol must be without additives and auto glycol must not be used.Automatic bleeding has to be installed at the highest point of the 2 pipes — supply or return pipe.

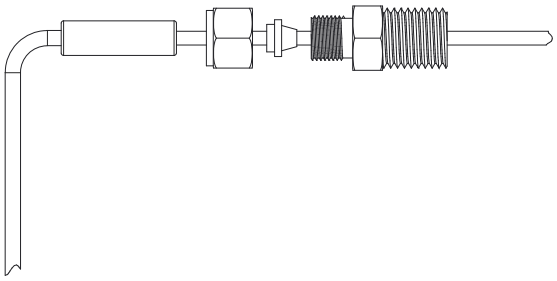
If the heating battery is built with 3 or more rows, the water flow must be in counter flow to the direction of the air.



To protect against frost a temperature sensor for the transmission of an analog signal to the controller is placed in a pipe on the collection pipe for return water. The sensor must be fitted water tight with a cap in the pipe before water under pressure is in the battery. The pipe for the sensor is soldered on the collection pipe and it is important to hold contra on the pipe, when the cap is tightened.



Battery seen from above. The sensor measures the water temperature of the water inside one of the small pipes for return water in the battery. The sensor reduces the area in this pipe and hereby also the flow of warm water in this pipe. The temperature in this pipe is reduced more than the temperature in all other pipes by the airflow through the battery. Because the lowest temperature in the battery probably is measured here, this system creates early and safe warning of frost.



It is important that the cap is tightened sufficient to keep the sensor system fully water tight.

i.4.4.3.2 Pipe connection to cooling coils for chilled water

Coils with 3 rows or more must always be connected in counter flow to the airflow.
NOTE: The glycol must be without additives and auto glycol must not be used.
Automatic bleeding has to be installed at the highest point of the 2 pipes — supply or return pipe.

i.4.4.3.3 Valve motor and valve for heating

The valve and valve motor are not installed. 2-way or 3-way valve is available.

i.4.4.3.4 Valve motor and valve for cooling

TThe valve and valve motor are not installed. 2-way or 3-way valve is available.

i.4.5 Draining condensate water

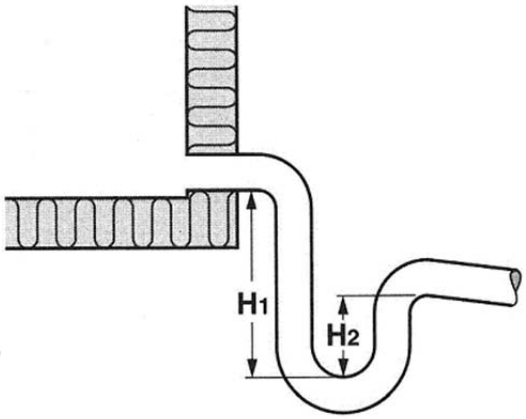
Drip trays for collection of condensate water are installed under plate heat exchanger and cooling coil. Each drip tray is provided with a drainage outlet. A water trap is always necessary. To avoid freeze ups and frost bursts of water trap and pipes, sufficient insulation is recommended and installation of heating between the insulation and water trap/pipes could even be necessary (insulation, heating and controller for the heating are not delivered by Systemair).

i.4.6 Draining condensate water from plate heat exchanger

Heavy negative pressure where the condensate from the plate heat exchanger is collected in the drip tray allows air to flow through the drainage pipe into the unit and prevents condensate water from flowing out of the unit through the drainage pipe. A water trap with sufficient closing level of the water is extremely necessary to ensure that condensate water flows out of the unit. The pipe diameter of the water trap and sewage system must be identical to the pipe diameter of the drainage outlet from the tray.
The closing level of the water trap must be estimated correctly to ensure safe escape of the water (see the illustration and estimate the minimum closing level according to the table).
A water trap is optional and installation of the water trap is not included.

Negative pressure P (Pa)

P	H1 Minimum	H2
500 Pa	100 mm	40 mm
750 Pa	150 mm	55 mm
1.000 Pa	190 mm	70 mm



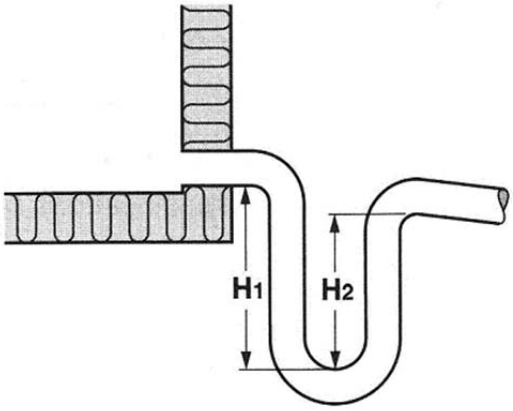
i.4.7 Draining condensate water from cooling battery

If the cooling battery and the drip tray are placed in the unit where negative pressure (under pressure) occurs, the closing level of the water trap must be estimated correctly. See the above-mentioned information in section i.4.6 – Draining condensate water from the plate heat exchanger.

If the cooling battery and the drip tray are placed in the unit where positive pressure (over pressure) occurs, the closing level of the water trap must be estimated correctly as shown on the illustration. A water trap is optional and installation of the water trap is not included.

Positive pressure P (Pa)

P	H1 Minimum	H2
500 Pa	90 mm	65 mm
750 Pa	120 mm	90 mm
1.000 Pa	150 mm	120 mm



j. Installation and assembly instructions for reduction of noise and vibration emissions

Due to the design and construction of the units the (A) weighed sound pressure level from fans and other components do not exceed 70 dB (A) outside the units.
Data about sound in annex 2.

Installation of the units on springs will reduce the transmission of noise and vibrations to the building. Systemair does not deliver springs for this purpose.
Flexible connections between the units and the ducts are available as accessories.

k. Instructions for putting into service, adjustments, use and commissioning.

k.1 Print-outs on paper

The documents listed below are always printed on paper and delivered together with the units according to the Machinery Directive and the related national laws
This User Manual with;

- Declaration of incorporation – annex 1
- The unique technical data for this unit - annex 2
- Installation instructions including instructions for the Danfoss frequency converter – annex 4-12
- Printed form for Commissioning protocol - annex 13
- Test report – annex 14
- Short description about the main components in the control system – annex 15
- Wiring diagrams - annex 16
- Operator's guide for the Systemair control panel - annex 17

k.2 Electronic media

A DVD is delivered with every unit. The below-mentioned documents are available on every DVD and this means that every DVD is provided with information about many components that are not delivered with every unit. The documents on the DVD:

Common

- This User Manual
- Operator's Guide
- Commissioning Protocol as a Word-file for modification by the installer

Components in the control system

- Danfoss frequency converter
- Corrigo controller manuals
- Information about Building Management Systems
- Damper motors
- Filter guards
- Temperature sensors
- Fire thermostats
- Smoke detectors
- Pressure transmitters
- Valves
- Valve motors
- Humidity sensors
- CO2 sensor
- Humidity sensor
- Humidifier
- E-Tool software for fast communication with the Corrigo controller
- Other

k.3 Documentation is available for download from https://techdoc.systemair.dk

Your local Systemair company is able to provide the data or possibly a Password.

k.4 Start-up by installer

All protection and safety measures must be met before start-up of the unit. The mains supply voltage must also be checked too. The mains supply voltage must be measured at the supply terminals in the cabinet.

k.4.1 Checklist, relevant values

k.4.1.1 Checklist prior to start-up

- Is the unit assembled correctly with its functions in the correct order? See annex 2.
- Are the sections and ducts assembled correct? See annex i.
- Check that fans and anti-vibration mounts are not damaged after transportation and installation.
- Is the rotary exchanger turning freely?
- Are safety guards installed correctly?
- If the unit includes integrated cooling (DVU), check whether it is installed and supervised by qualified service personnel.
- If the unit contains Electric air heater, make sure that the supply isolator disconnects with the unit.
- Ducts - are all ducts installed?
- External components - are the valve and valve motor installed correctly?
- Is the circulation pump installed correctly?
- Is water under pressure in the coil and circulation pump?
- Are the pressure transmitters installed and connected correctly? (If this is a system with pressure transmitters in the ducts)
- Main power supply:
  - Connected correctly? (3x400 V + N + PE)
  - Test of supply voltage for actuators and control signal!
  - Are control signals for actuators connected correctly?

k.4.1.2 Switch on power

Do not start until all safety procedures have been completed and ensure that inspection doors are closed and locked.
Switch on power and the unit should be ready for the start-up.
For start-up see the Operator's guide for the Systemair control panel - annex 17 (this manual is delivered with the unit – printed on paper and also available on the delivered DVD).

K.5 Adjustments and use

Adjust the factory set values for parameters on the Systemair Control Panel or via the software E-Tool on a PC. See the Operator's guide for the Systemair control panel - annex 17 (this manual is delivered with the unit – printed on paper and also available on the delivered DVD. Further information about the controller is available on the 100 pages in the Corrigo E28 User Manual that is available on the delivered DVD.
E-Tool software is also available on the delivered DVD and for download from a homepage.

K.6 Description of functions

K.6.1 Remote control

k.6.1.1 Communication WEB-master (TCP/IP Exoline) to PC and Android telephone

The controller has been prepared with a WEB-master interface (WEB side integrated) available when connected to a LAN network. It is possible via the LAN network to read values and to change some parameters – for example set-point temperatures, schedules, air flow capacity. It is possible to read and reset present alarms. There are 2 levels of login.

k.6.1.2 Communication to BMS systems with MODBUS

The controller has been prepared for communication via RS485 communication port to a MODBUS based BMS system (Building Management System).
The controller can work as a stand-alone system without any support from other controllers. Special setup of the controller for communication with the BMS system is not included in the delivery from Systemair.

k.6.1.3 Communication to BMS systems with LON

The controller has been prepared for communication via LON communication port to BMS systems (Building Management Systems).The port uses LonWorks according to the LonMark-guidelines. The LON-interface variables are available from Systemair. The controller can work as a stand-alone system without any support from other controllers. Special set-up of the controller for communication with the BMS system is not included in the delivery from Systemair.

k.6.1.4 Communication to BMS systems via BACnet

The controller has been prepared for BACnet TCP/IP interface. This can be used for communication with a BMS system (Building Management System).
The controller can work as a stand-alone system without any support from other controllers. Special set-up of the controller for communication with the BMS system is not included in the delivery from Systemair.

K.6.2 Extended operation and external start/stop (for example by presence detectors)

When the unit is running at reduced speed or is in shutdown mode, it can be forced up one step by using a Push button (impulse). The required number of minutes for the extended operation must be selected on the Systemair Control Panel. Button and cable are not delivered by Systemair. Furthermore when the unit is in shutdown mode it is possible to start/stop the unit by presence detectors. Presence detectors and cable are not delivered by Systemair.

k.6.3 Valve and valve motor for heating coil

The supply voltage for the water valve actuator is 24V AC, the control signal is 0-10 V. The sensor for water temperature has to be installed in the heating coil and the sensor is provided with cable but not connected to the terminals in the cabinet. The cable between valve motor and terminals in the cabinet is not delivered by Systemair. Standard valves are available for 2 or 3-way connection.

k.6.4 Valve and valve motor for cooling coil

The supply voltage for the water valve actuator is 24V AC, the control signal is 0-10 V. Cables between valve motor and terminals in the cabinet are not delivered by Systemair. Standard valves are available for 2 or 3-way connection.

k.6.5 DX cooling

A DX-cooler can be connected to the controller. Input and output are available for:
Start cooling – Alarm cooling – Cooling Y3. Cables are not delivered by Systemair

k.6.6 Circulation pump, heating

Circulation pump is not included in the delivery from Systemair. If the pump has not been activated for 24 hours, the pump is exercised once daily for 1 minute to keep the pump in a good condition. Cables are not delivered by Systemair.

k.6.7 Fire alarm function

k.6.7.1 External fire signal that indicate block or run

The unit is available without components for this function. The controller is as standard configured for ordinary running when the contact is closed (NC). By open contacts the fans stop and the dampers close. If disconnected, fire is indicated and the unit will stop until the signal is re-connected. On the site qualified technicians are able to change the configuration.

k.6.7.2 External fire signal

The unit is delivered without components for this function. The controller is as standard configured for ordinary running when the contact is closed (NC). By open contacts the fans stop and the dampers close. When the unit has been shut down by a fire signal, the unit has to be restarted on the control panel. On the site qualified technicians are able to change the configuration.

k.6.7.3 Two fire thermostats

The unit is available with 2 thermostats installed in the unit – 1 in the extract air and 1 in the supply air. The cut-off temperature in the thermostats is adjustable between 40 and 70˚C. At the factory supply is set at 70˚C and extract is set at 40˚C. The controller is as standard configured to stop the fans and close the dampers if a thermostat is released. On the site qualified technicians are able to change the configuration.

k.6.7.4 One smoke detector in extract air

The smoke detector has been installed in extract air next to the fan. The controller is as standard configured to stop the fans and close the dampers if the detector is released by smoke. When the unit has been shut down by a fire signal, the unit has to be restarted on the control panel. On the site qualified technicians are able to change the configuration.

k.6.8 E tool - configuration tool

The installer can download the PC software called E tool from www.regincontrols.com and this software enables the installer to configure and supervise the function of the system via a graphic interface. This software displays all the parameters to be written in a commissioning report (the commissioning report is available as a Word-file on the CD delivered with the unit). The TCP/IP port in the Corrigo E28 controller is prepared for communication with the E tool software.

k.6.9 Electrical heater battery

k.6.9.1 Control of heating capacity connected to unit with Systemair control system

Electrical heater installed with separate controller beside the heater. The separate controller is designed for capacity conversion of the 0-10 V control signal from the main control system. The electric heater is not supplied from the air handling unit cabinet as the cabinet is not designed to supply the heater with power. No power supply cables are connected to the electric heater. The separate controller is without supply disconnecting device

k.6.9.2 Control of heating capacity connected to unit without Systemair control system

Electrical heater installed with separate controller beside the heater. The separate controller is designed for capacity conversion of the 0-10 V control signal from the main control system. The heating capacity is adapted in steps.
The electric heater is not supplied from the air handling unit cabinet as the cabinet is not designed to supply the heater with power. No power supply cables are connected to the electric heater. The separate controller is without supply disconnecting device.

k.6.10 Speed control of fans

k.6.10.1 TIME control system – EC motors

Fan motor revolutions are controlled by the EC motors. The EC motors are configured and tested to comply with the data of the unit.

k.6.10.2 DV control system - frequency converters inside the unit are IP 20

Fan motor revolutions are controlled by frequency converters, and they are configured and tested to comply with the data for the unit. The frequency converter for each fan motor is installed inside the unit beside the fan motor with cables between motor and converter. In units with complete control system the frequency converters are delivered with system parameters adapted to the motors and the project.

k.6.10.3 Pressure transmitters

Separate control of the air flow or duct pressure for supply fan and for extract fan. The required air flow or duct pressures with normal as well as reduced capacity are selected on the Systemair Control Panel.
The actual pressure is measured by pressure transmitters. PI calculation in the controller continuously transmits the necessary revolutions for the fans to the frequency converters to achieve the required pressure.

k.6.10.4 CO2-dependent air flow

The air flow is controlled by a CO_2 sensor. High CO_2 concentration is equal to higher air flow. Low CO_2 concentration is equal to lower air flow. Based on the actual CO_2 level and a min/max level, the needed airflow is calculated. The speed of each fan is adjusted via frequency converter. Terminals in the cabinet are available for connection of the sensor.

k.6.10.5 Humidity dependent air flow

The air flow is controlled by the humidity sensor. High humidity is equal to higher air flow. Low humidity is equal to lower air flow. Based on the actual humidity level and a min/max level the needed airflow is calculated. The speed of each fan is adjusted via frequency converter. Terminals in the cabinet are available for connection of the sensor.

k.6.11 Cabinet

k.6.11.1 Integrated cabinets in TIME units

TIME units are delivered with 2 integrated cabinets. One cabinet in the supply fan section and one cabinet in exhaust fan section. Both cabinets are installed behind inspection doors. External components must be connected to terminals in the cabinet in the supply fan section.

k.6.11.2 Integrated cabinet in DV units with control system

Cabinet is integrated in the unit behind an inspection door. Terminals are installed in the cabinet for all external components. The number of terminals is always adapted to the individual order.

k.6.11.3 Cabinet placed on the DV unit with control system

The models with the cabinet on the unit are exclusively for indoor installation. Terminals are installed in the cabinet for all external components. The number of terminals is always adapted to the individual order.

k.6.12 Temperature sensors

Four sensors are always delivered with each unit. See below where the sensors are placed;

- 1 sensor in the extract air, installed inside the unit

- 1 sensor in the outdoor air, installed inside the unit before the supply air filter on the cold side of the heat exchanger
- 1 sensor in the supply air to be placed in the supply air duct by the installer
- 1 sensor in the exhaust, installed inside the unit

k.6.13 Damper motors

Four different types of damper motors are available;

- On/off damper motor, not modulating, without spring function. Torque is 20 Nm and run time is 150 seconds
- On/off damper motor, modulating, without spring function. Torque is 20 Nm and run time is 150 seconds
- Spring-return damper motor, not modulating, with spring function. Torque is 20 Nm and run time is 150/16 seconds
- Spring-return damper motor, modulating, with spring function. Torque is 20 Nm and run time is 150/16 seconds

k.6.14 Filter guards

Filter guard over pre-filter and primary filter installed and connected to the controller for display of alarm when the mechanically set limit is exceeded. Filter alarm will be displayed on the Systemair Control Panel.

k.6.15 Room temperature sensors

One or two external room temperature sensors are available. The cabinet has been prepared with additional terminals for connection of the room temperature sensors. The sensors are delivered without cable. The controller calculates an average of the value from the 2 sensors as input for the control.

k.6.16 Frost protection

For the frost protection of the heating coil, the water temperature in the coil is transmitted to the controller by a temperature sensor in a water return circuit of the coil. The controller always generates a signal to the valve motor that keeps a sufficient flow of hot water to protect the coil against frost. This frost protection is also activated when the running mode is “off”.
If the water temperature falls below the set point temperature the fans stop, the dampers close, and an alarm is activated.
From Systemair every heating coil for hot water is provided with a little pipe at the collection pipe for the return water. This little pipe is prepared for the installation of the above mentioned temperature sensor for the transmission of the return water temperature to the controller.

k.6.17 Systemair Control Panel - SCP

The separate cable-connected (10m) hand terminal with display and buttons – the Systemair Control Panel is always necessary for the normal handling and programming, because the main Systemair E28 controller is without display and buttons.

k.6.18 Cooling recovery

If the extract air temperature is lower than the outdoor air temperature, and there is a cooling demand in the rooms, the cooling recovery will be activated by reversing the heat exchanger signal. The signal is increased to the cooling recovery by increasing cooling demand.

k.6.19 Free cooling

A temperature sensor has been installed inside the unit in the outdoor air entrance. If the outdoor temperature after midnight is below the room temperature set point and the actual average room temperature is above the set point temperature, the fans start during the summer to cool down the building during night hours.

k.6.20 Alarm signal

By alarm there are 24 V DC on terminals in the cabinet. Lamps and cables are not available from Systemair.

k.6.21 Heat recovery

The heat recovery capacity is controlled by modulating speed of the rotor

k.6.22 Frost protection – plate heat exchanger

To prevent the plate heat exchanger from being blocked and damaged by ice when the outdoor air temperature is very low, the exhaust air temperature from the coldest area after the heat exchanger is transmitted to the controller by a temperature sensor. The dampers are controlled by modulating damper motor or damper motors to reduce the flow of outdoor air through the exchanger and to increase the flow of outdoor air through the bypass duct. By this sequence the risk of ice blocking of the exchanger is reduced and please note the capacity of the heating battery is sufficient for heating this mixture of preheated and not preheated supply air.

k.7 Commissioning

When the installer has completed the installation and wants to hand over the finished installation to his customer for payment the commissioning protocol can be the written receipt for the full ended job. Fill in the blank spaces and sign the proposed commissioning protocol that is annex 13, or fill in the Word-file with a Commissioning Protocol that is included on the DVD delivered with the unit.

l. Information about the *residual risks* that remain despite the inherent safe design measures, safeguarding and complementary protective measures adopted.

l.1 Unit casing.

l.1.1. Design of the machine to make transport safe

Hazards/dangerous area:
Incorrect handling during transportation may cause that the unit is dropped.
Dangerous incident:
If a person is hit by a unit that is dropped, this could in unfortunate circumstances lead to irreversible injury or death.
Claim for reduction of danger:
Correct handling during transportation is described in this manual. If lifted by fork-lift truck the forks of the truck must be sufficiently long. Safety measures are also described in this manual by use of crane. Information about weight of each section is also visible.

l.2 Common for all unit sections

l.2.1 Risk caused by surfaces, edges and corners

Hazards/dangerous area:
Sharp edges on plates might occur inside the machines as well as sharp edges on frames of dampers. No sharp edges on the outside of the units.
Dangerous incident:
Cut fingers/hands.
Claim for reduction of danger:
Risk only exists during maintenance and cleaning. This takes place at least once every year. Use of gloves and helmet is described in this manual. Cut-resistant gloves for protection against injury from sharp metal

plate edges. Use CE-marked gloves for this purpose. Lamps mounted inside the unit with sufficient lighting reduce the risk of injury.

l.3 Common for all unit sections by insufficient lighting

l.3.1 Risk caused by insufficient lighting inside sections

Hazards/dangerous area:
On the floors of the units there are handles to hold filters, profiles for the carrying of fan motors. Cables are between fan motors and frequency converters.
Dangerous incident:
By insufficient lighting, the above-mentioned obstacles are not visible with the risk of stumbling that becomes a fall, leading in unfortunate circumstances to irreversible injury or death.
Claim for reduction of danger:
Risk only exists during maintenance and cleaning. This takes place at least once every year. According to this manual and in the SystemairCAD software for configuration and selection of accessories, lamps for sufficient lighting inside the units are mandatory according to the latest interpretations of the Machinery Directive by the authorities. Use of helmets reduces the risk of injury.

l.4 Dampers type DVA – DVB – DVM – DVP – Bypass dampers in DVQ

l.4.1 Risk caused by maintenance and cleaning of dampers

Hazards/dangerous area:
Are between the damper blades and the system of bars and links between motor and damper blades.
Dangerous incident:
Crushing of fingers.
Claim for reduction of danger:
Examination is still under preparation in our own laboratory. Still no voluntary test persons are available.

l.5 Attenuators type DVD

l.5.1 Risk caused by maintenance and cleaning of attenuators

Hazards/dangerous area:
High concentration of dust on the surface of the baffles might be harmful to the health.
Dangerous incident:
To breathe in particles that is harmful to the health.
Claim for reduction of danger:
Risk only exists during maintenance and cleaning. This takes place at least one time every year. Use of particulate respirator is described in this manual. Particulate respirator – maintenance free including foam face-seal and adjustable pre-threaded headbands (same particulate respirator as recommended for change of filters).

l.6 Filters type DVG – DVF

l.6.1 Risk caused by missing change of filters

Hazards/dangerous area:
Missing change of filters and missing maintenance decrease the capacity and final consequence will be breakdown.
Dangerous incident:
By extensive lack of of filter change and maintenance the machine can break down.
Claim for reduction of danger:
In the manual is the method and schedule for change of filters and maintenance specified.

l.6.2 Risk caused by the execution of filter change

Hazards/dangerous area:
Filter panels and filter bags
Dangerous incident:
To breathe in particles that is harmful to the health.
Claim for reduction of danger:
Use of particulate respirator – maintenance free including foam face-seal and adjustable pre-threaded headbands (same particulate respirator as recommended for cleaning of attenuators.

l.7 Plug fans type DVE

l.7.1 Risk caused by lightning strike

Hazards/dangerous area:
Lightning strike close to the machine.
Dangerous incident:
Lightning strike can create flash over between phases and conductive parts. This can cause fire or the overvoltage can make injury on persons
Claim for reduction of danger:
Installer and user must be aware of the fact that lightning makes a risk that requires installation of overvoltage protection devices to lead the lightning overvoltage to an earth lead on a safe way. The need for overvoltage protection devices depend on where the unit is placed in and on the building.
Installer and user must take care of this according to local statutory requirements. Overvoltage protection devices are also described in section i.3.3.3 of this manual.

l.7.2. Risk caused by permanent magnet motor

Hazards/dangerous area:
Rotation of the shaft generates electricity. This danger is always visualized by a yellow warning label on the inspection door where permanent magnet motors are installed.

Dangerous incident:
Persons touching conductive parts get electric shock, burns, heart flicker and so on.
Claim for reduction of danger:
By installation or repairs of conductive components, the shaft must be blocked to prevent any rotation.

l.7.3 Risk of rotating impeller caused by stack effect (chimney effect).

Hazards/dangerous area:
On special occasions stack effect – also called chimney effect – in the ducts create airflows that drives the impellers by turned off motors.
Dangerous incident:
Injury of fingers, hands and arms.
Claim for reduction of danger:
Eliminate this airflow for supply air and exhaust air by dampers with spring return motors for automatic closing of the dampers by turned off fan motors and by power failure.

l.8 Batteries for heating and cooling type DVR – DVH – DVK, cooling compressor

l.8.1 Extreme temperatures - heating

Hazards/dangerous area:
Electrical heating elements can achieve surface temperature of 500 degree Celsius.
Batteries and pipes for hot water can achieve 95 degree Celsius.
Dangerous incident:
According to ISO 13732-1:2006, here is no direct risk of burns. (short-time contact – lesser than 2,5 sec).
Claim for reduction of danger:
No.

l.8.2 Extreme temperatures - cooling

Hazards/dangerous area:
Evaporator batteries and pipes connected to cooling compressor can achieve minus 10 degrees Celsius.
Dangerous incident:
According to ISO 13732-1:2006, here is no direct risk of burns. (short-time contact – lesser than 2,5 sec).
Claim for reduction of danger:
No.

l.9 Cooling compressor units type DVU – DVU-C

l.9.1 Risk of high temperature

Hazards/dangerous area:
Condenser batteries and pipes can achieve temperature of 60 degree Celsius.
Dangerous incident:
Vurderet ud fra ISO 13732-1:2006, der er umiddelbart ikke risiko for forbrændinger. (berøringstid 2,5 sek).
Claim for reduction of danger:
No.

l.9.2 Risk caused by lightning strike

Hazards/dangerous area:
Lightning strike close to the machine.
Dangerous incident:
Lightning strike can create flash over between phases and conductive parts. This can cause fire or the overvoltage can make injury on persons
Claim for reduction of danger:
Installer and user must be aware of the fact that lightning makes a risk that requires installation of overvoltage protection devices to lead the lightning overvoltage to an earth lead on a safe way. The need for overvoltage protection devices depend on where the unit is placed in and on the building.
Installer and user must take care of this according to local statutory requirements. Overvoltage protection devices are also described in section i.3.3.3 of this manual

m. Instructions on the protective measures to be taken by all service technicians during repair and maintenance

Use the below-mentioned personal protective equipment for maintenance:

- Cut-resistant gloves for protection against injury from sharp metal plate edges. Use CE-marked gloves for this purpose.

- Helmet
- Particulate respirator – maintenance free including foam face-seal and adjustable pre-threaded headbands – for replacing filters.
- Padlock for locking the automatic circuit breakers in off position
- Permanent magnet motor. The shaft must be blocked during repairs and maintenance of the electric system (the motor generates electricity by rotation – for example that the wind and thermic drives the fan/motor).
- Lighting inside the units. According to the latest interpretations of the Machinery Directive by the authorities sufficient lighting inside the units is mandatory.
- Tools to block the impeller during repairs and maintenance if stack effect – also called chimney effect – in the ducts create airflows that drives the impellers by turned off motors

n. The essential characteristics of tools which may be fitted to the machinery

The subject in the Machinery Directive about tools on the machine does not exist for the TIME and DV air handling units, because those tools does not exist.

o. The conditions of stability during use, transportation, assembly, dismantling when out of service

The unit must always be handled in an upright position. Never tilt any section more than 15 degrees. If sections must be tilted more than 15 degrees, sections with fans or rotating exchangers that can be drawn out for service must be secured carefully.
During transportation, installation, dismantling or other handling, it must be secured that all components in the unit are properly fastened and with additional attention to the control of anti-vibration mounts under the fans that they are undamaged. The mounting and smooth running of the fans must be controlled and handled with great care.

o.1 Installed reliable to avoid units to be tilted or moved by the any storm.

Units installed on roofs and other places with the risk of heavy winds must be installed reliable to avoid that they can be tilted or moved by the any storm. The base frame is provided with holes that are intended for fastening by sufficient bolts and fittings supplied by the installer.

o.2 Transport of section with cooling compressor unit

During transportation, the unit section – DVU and DVU-C - **must** always be in the upright position or tilted less than 30˚. If it is necessary to tilt the unit more than 30˚, the suction pipe of the compressor must point upwards to prevent the escape of oil from the compressor sump.

o.3 Disposal of the cooling compressor system - type DVU and DVU-C

Prior to the disposal of the DVU or DVU-C unit section, the refrigerant in the cooling system must be drained off by a skilled technician from a certified company. After correct evacuation of the refrigerant, the disposal of the DVU or DVU-C unit section is similar to the disposal of the rest of the air handling unit.

o.4 Generel disassembly – sharp edges

Pay attention to several sharp edges during dismantling and disposal of the unit. To avoid injury, CE-marked cut-resistant gloves as well as helmet must be used. The measures are described further in the Maintenance, Dismantling and Disposal Manual.

p. Instructions for machinery where these are regularly to be transported

The subject in the Machinery Directive about machinery that are regularly to be transported does not exist for the TIME and DV air handling units, because those units are for specially made for one intended application.

q. The operating method to be followed in the event of breakdown. Safe restart.

Use the below mentioned procedure in the event of breakdown or blockage:

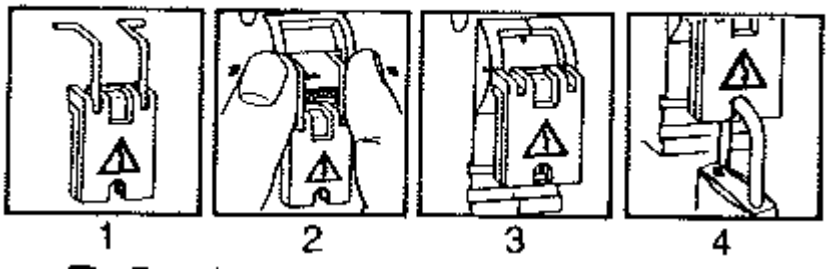
- Switch off the power and lock the supply disconnecting device in the off position.
- Remove the reason for breakdown or blockage.
- Follow the start-up procedure described in section k.

r. Adjustment and maintenance operations

Must be performed by skilled technicians.

r.1 Shutdown of the unit to a safe state.

Switch the unit to OFF on the Systemair Control Panel. See the - Operator's Guide – Annex 17.Switch off the automatic circuit breakers and block them by padlocks. The automatic circuit breakers are marked F1 to F4. See the illustration below about how to place a padlock on each automatic circuit breaker.



Check that the automatic circuit breaker marked F5 is still switched on because the lamps inside the unit, and only those lamps, are connected to this switch. Switch on the lamps for light during the maintenance activities.
Use the start-up procedure described in section k, when the maintenance activities are completed.

r.2 Recommended maintenance intervals

Function	Maintenance	Number per year
Unit casing	Cleaning of the unit casing.	1
	Control of rubber seals on doors and between sections.	1
Filters	Change on demand by alarm and always minimum twice a year.	2
	Control of rubber seals. Control of the system with lateral locking rails and handles on TIME and DV10 – DV150. Control of the filter bank frames with fasteners on DV190 and DV240.	2
Fans	Cleaning of all parts.	1
	Check motors and bearings	1
	Check that the impellers are rotating without dissonance.	1
	Check that anti-vibration mounts are intact.	1
	Check that the unit is operation without vibrations after the cleaning, overhaul and maintenance.	1
Rotary heat exchanger	Check that leakage and dirt accumulation is insignificant	1
	Check that the rotor can turn freely and easily manually with a hand when the belt is removed from the drive	1
Plate heat exchanger	Check bypass function and sequence for de-icing	1
Run-around heat exchanger	Check the exchanger function and test the frost protection. The glycol must be without additives and auto glycol must not be used.	
Dampers	Test the operation.	1
	Visual inspection of seals and tightness when closed.	1
Hot water battery	Check the dirt accumulation and clean, if needed.	1
	Bleeding, if needed.	1
	Test of frost protection sequence	1
	Test of cirkulation pump	1
Electric heating battery	Check dirt accumulation and clean, if needed.	1
	Test the function of the system with the fuses for the safety.	1
Cooling battery	Check dirt accumulation and clean, if needed.	1
	Test the frost protection (glycol)	1
Cooling compressor unit	Mandatory annual control of the compressor system. Must be done by certified technician from a certified company.	1
Condensate drain	Cleaning of tray, water trap and outlet. Check the electrical heating between insulation and pipes, if installed.	1
Saving- and comfort functions	Test of CO2 sensor, humidity sensor, motion sensor, pressure transmitters for air capacity control, extended operation via button, cooling recovery, free cooling	1
Fire alarm	Test of thermostats, smoke detectors and fire detection systems	1
Battery in controller	Change the battery on demand by alarm in the display and always change the battery as a minimum every 5. Year.	1
Remote control	Test of Communications.	1

r.3. Filters – sizes and numbers

Filters in supply air and in extract air are always the same sizes and the same numbers. See the filters in supply or extract air below. REMEMBER to order filters for supply as well as for extract.

Size of unit	Numbers and sizes of frames for bag filters (WxH)
10	1x[792x392]
15	2x[490x392]
20	1x[490x490] + 1x[592x490]
25	2x[592x592]
30	1x[592x592]+ 1x[490x592] + 1x[287x592]
40	3x[490x742]
50	3x[592x490] + 3x[592x287]
60	8x[490x490]
80	4x[490x592] + 4x[490x490]
100	4x[592x592] + 4x[490x592]
120	4x[592x592] + 4x[592x490] + 4x[592x287]
150	9x[592x490] + 6x[490x490]
190	15x[592x592]
240	15x[592x592] + 3x[287x592] + 5x[592x287]

Size of unit	Numbers and sizes of frames for panel filters (WxHxD)
10	2x[376x376x44]
15	2x[448x448x44]
20	1x[241x495x44] + 1x[495x495x44] + 1x[391x495x44]
25	2x[445x622x44] + 1x[391x622x44]
30	3x[445x622x44]
40	6x[495x368x44]
50	6x[622x391x44]
60	8x[495x495x44]
80	4x[495x495x44] 4x[495x597x44]
100	10x[445x622x44]
120	15x[495x445x44]
150	21x[391x495x44]
190	15x[592x592x25]
240	15x[592x592x25] + 3x[287x592x25] + 5x[592x287x25]

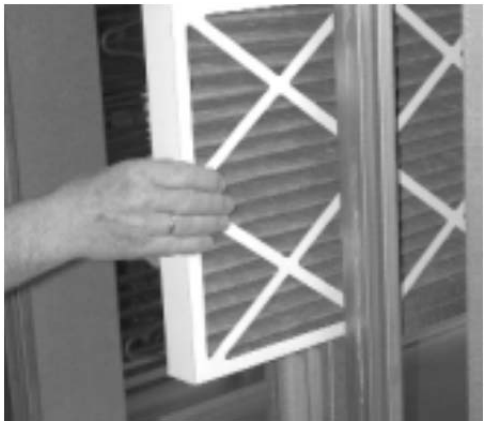
NOTE that special sizes of filters are available by Camfil.

r.3.1 Bag filters

Release the bag filter cells by activating the handles and pull out the filter cells of the unit casing. The frame profiles are to be cleaned and all seals checked for damage. The handles and locking guide rails are also to be checked to ensure that they can operate unobstructed. The new filter bags must be pushed carefully into the unit in order to ensure that they are sealed properly. The various filter sizes should be placed in an order corresponding to the way in which the unit is designed, and the filters must have vertical bags.

r.3.2 Panel filters

The filter cell guide rails are to be cleaned before fitting the new filters.

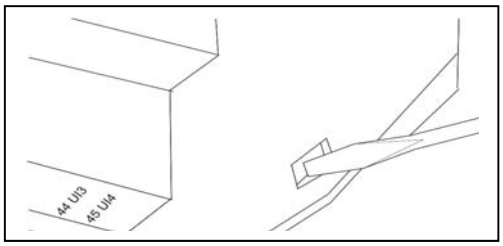


r.4. Changing the Internal Battery in the controller

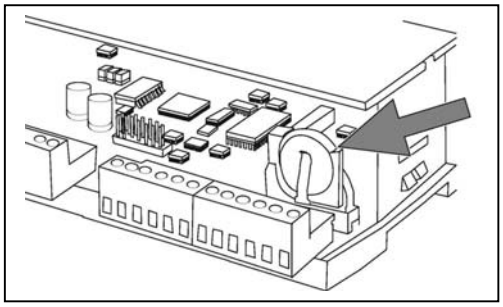
Note: This procedure requires knowledge of proper ESD protection; i.e. an earthed wristband must be used! When the alarm "Internal Battery" is activated and the battery LED lights up red, the battery for backup of program memory and real-time clock has become too weak. The battery is replaced as described below. A backup capacitor saves the memory and keeps the clock running for at least 10 minutes after the power supply is removed. Therefore, if the battery replacement takes less than 10 minutes, there will be no need to reload the program, and the clock will continue to run normally.

The replacement battery must be of the type CR2032.

Remove the cover by pressing down the locking torques at the edge of the cover using a small screwdriver, and at the same time pulling the edges outwards.



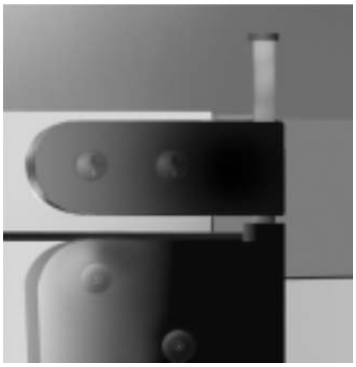
Grip the battery firmly with your fingers and lift it upwards until it rises from its holder. Press the new battery firmly down into place. Note that to preserve correct polarity; the battery can only be inserted the "right way round".



r.5 Other functions to maintain

r.5.1 The unit

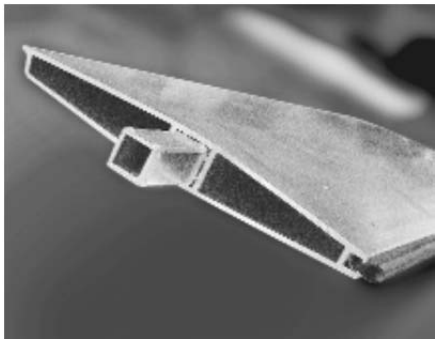
The unit should be cleaned once a year when operating with normal air quality for comfort ventilation with no special hygiene requirements.
To clean the unit, dry it off with a dry cloth, or use water mixed with a non-corrosive cleaning medium.
Any corrosion i.e. at the filters should be cleaned off immediately, and the surface treated.
In special operating conditions, where the air is aggressive or very humid, for example, or where there are special hygiene requirements, the unit shall be cleaned more frequently as required.
Cleaning medium and method should be adapted to the relevant conditions. Any corrosion should be cleaned off immediately, and the surface treated.
Closing mechanisms are to be lubricated at least once a year. Synthetic door hinges are service free. Seals around inspection doors are to be cleaned at least once a year and are to be checked for leakage.
It is recommended to treat the seals with a moisture repellent agent. Connecting pieces for the unit sections, including the Disc-Lock types, are to be checked for tightness at least once a year.
All seals are to be inspected at least once a year and are to be repaired if necessary.

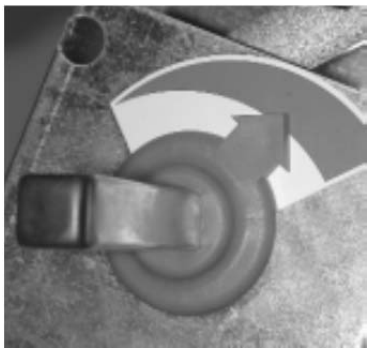


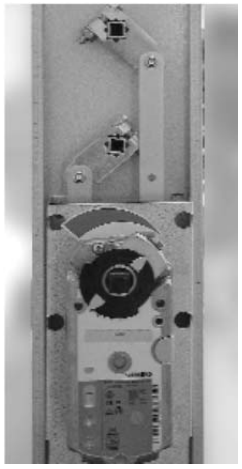
Grilles for air intake and exhaust air outlet are to be cleaned at least once a year to prevent blockage.

r.5.2 Dampers

Rubber seals between the damper blades themselves and between the damper blades and the frame are to be checked once a year. These seals are not to be lubricated or treated in any other way.
Each damper blade is connected by a pivoting system. The steel rods and brass bushes do not require lubrication.
The damper blades are fitted with synthetic bearings requiring no lubrication. Air-tightness of the damper, when the damper motor is in the closed position, must be visually checked once a year. The damper motor is to be adjusted if the damper does not close tightly.







r.5.3 Rotary heat exchanger DVC

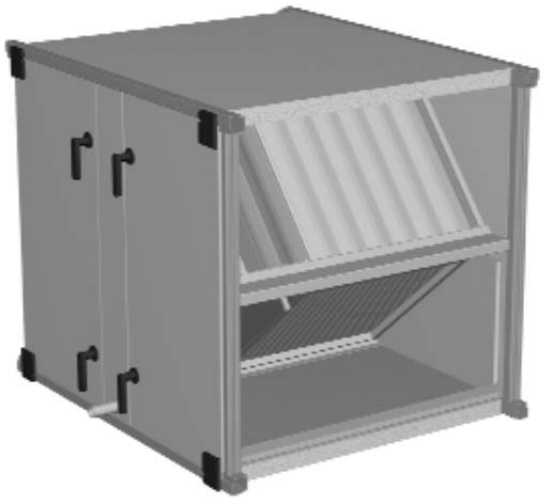
r.5.3.1 Rotor

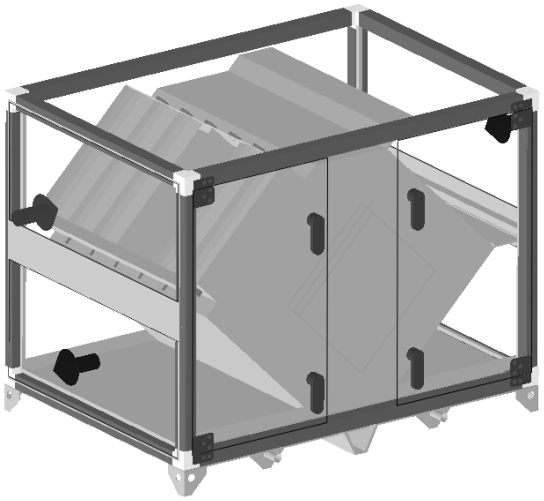
The rotor is to be checked at least once a year to ensure that it can turn freely and easily. This can be done by removing the belt drive at the motor and then turning the rotor manually with a hand on the peripheral rotor casing. At the same time the brush seals are to be checked for damage. The bearings are factory lubricated and do not require any service lubrication. During operation the rotor can become dirty. The rotor can be cleaned by blowing through with compressed air.
To ease inspection and service the rotor can be pulled out of the sizes 10, 15, 20, 25 og 30.

r.5.3.2 Motor and belt drive

The bearings are factory lubricated and do not require any service lubrication. The belt drive is to be checked for correct tightness and that it is undamaged. On smaller AHU, the rotor is fitted with an elastic belt drive and supplied with a reserve belt on the rotor. This belt drive does not require service and cannot be shortened. A new belt can be fitted using specialist tools. On larger heat exchangers the rotor has a V-belt with a belt connector. If the belt is no longer tight, it must be shortened to a length which enables the motor base frame tightening spring to hold the belt tight. If new screws are used for the belt connector, they must not have a length which exceeds the thickness of the belt and connector. Remove the excess, if any, with a file.

r.5.4 Cross flow and counter flow exchanger





Once a year the edges of the heat exchanger plates are to be checked for cleanliness and damage.

If there is dust on the edges of the plates, remove it with a soft brush. If grease or other such substances are present, then the edges must be washed using grease dissolving detergents.

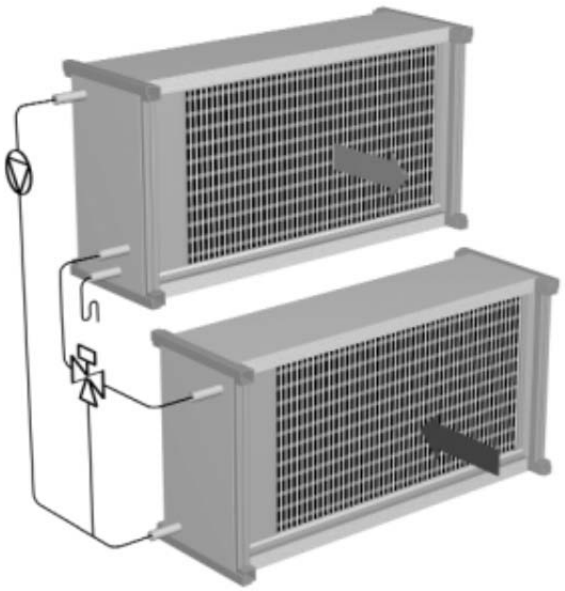
r.5.4.1 By-pass damper

The damper blades are fitted with synthetic bearings requiring no lubrication. Each damper blade is connected by a pivoting system. The steel rods and brass bushes do not require lubrication. Air-tightness of the dampers, when the damper motor is in the closed position, must be visually checked once a year. The damper motor is to be adjusted if the damper does not close tightly.

r.5.4.2 Condensate water drain

Once a year clean the drip tray beneath the heat exchanger, as well as the drain and the water trap.
Take care that that there is sufficient water in the water trap. If a droplet eliminator has been fitted, this must be checked once a year and cleaned if necessary.

r.5.5 Run-around heat exchanger DVR



A heat recovery system of this type consists of a heating coil in the supply air- flow and a cooling coil in the exhaust air- flow. After an extended running period (normally a few years) dust particles can accumulate on the surface of the coils. This can reduce the efficiency of the coils. Cleaning must be carried out with the utmost care to ensure that the coil fins are not damaged.
The piping system must be vented once a year as air in the system can significantly reduce the capacity of the coils.

r.5.5.1 Pump and pressure expansion

The service instructions issued by the pump manufacturer must be followed. The pressure expansion system must be checked once a year. If necessary, the pressure must be increased to the correct level.

r.5.5.2 Condensate water drain

Once a year clean the drip tray beneath the heat exchanger, as well as the drain and the water trap.
Take care that that there is sufficient water in the water trap. If a droplet eliminator has been fitted to the cooling coil, this must be checked once a year and cleaned if necessary.

r.5.6 Heating coil DVH, cooling coil DVK and change over coil DVHK

After an extended running period (normally a few years) dust particles can accumulate on the surface of the coil. This can reduce the efficiency of the coil. Cleaning must be carried out with the utmost care to ensure that the coil fins are not damaged. The piping system must be vented once a year as air in the system can significantly reduce the capacity of the coil.

r.5.6.1 Heating battery

Check that the frost protection system is fully operational. A battery may burst due to frost if the frost protection system is not operational.

r.5.6.2 Cooling battery

Once a year clean the drip tray beneath the cooling coil, as well as the drain and the water trap. Take care that that there is sufficient water in the water trap. If a droplet eliminator has been fitted to the cooling coil, this must be checked once a year and cleaned if necessary.

r.5.6.3 Electeric heating battery

Check that the built-in safety thermostat with an automatic reset function and the overheat thermostat with manual resetting are fully operational.

r.5.7 Plug fans DVE

Dust can accumulate on the fan impeller which can cause imbalance and vibrations. The fan impeller must therefore be checked once a year and cleaned, if necessary. Anti-vibration mounts and flexible connections should be checked at the same time. If the anti-vibration mounts are damaged in any way they must be replaced.

r.5.7.1 Motor

The motor are usually fitted with factory lubricated bearings which require no further lubrication.
Larger motors can be fitted with greasing nipples and bearings which require regular lubrication.
Lubricating these types of bearings must be carried out according to the manufacturer's instructions.

r.5.8 Silencer DVD

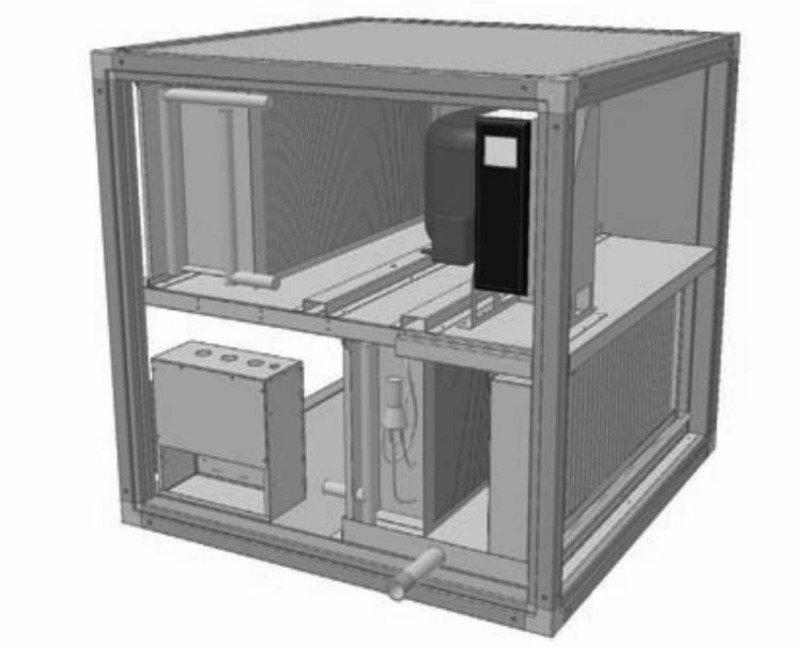
During operation dust particles can accumulate on the surface of the baffles. Silencers that are designed for dry and wet cleaning are fitted with baffles that can be extracted from the unit casing. Large inspection doors give access to easily extraction of the baffles. Baffles designed for dry cleaning can be cleaned using a soft brush or they can be vacuum cleaned. Baffles designed for wet cleaning can be washed down using a soft brush and soapy water. The detergent used must be non-aggressive. After washing, the baffles must be wiped dry with a cloth. Remember to clean the inside surface of the unit casing before refitting the baffles.

r.5.9 Outdoor air section DVY

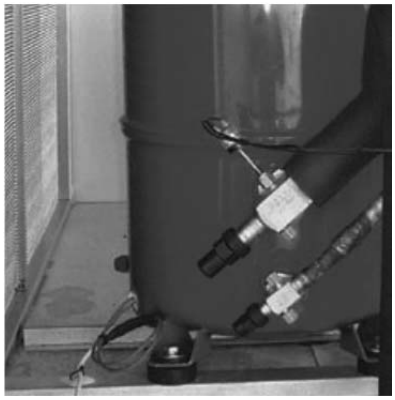
Dust and dirt can accumulate in this section. Large inspection doors give access for cleaning.

r.5.10 Cooling compressor units DVU and DVU-C

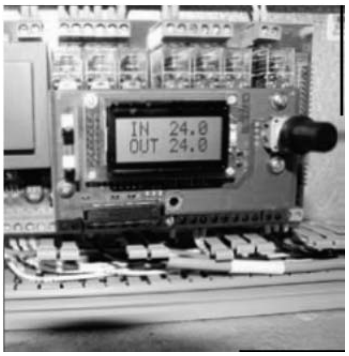
Mandatory annual control must be done by certified technicians from a certified company. See further description in annex 10 and 11.



r.5.10.1 Cooling compressor circuit



r.5.10.2 Built-in control system



r.5.10.3 Maintenance of built-in control system

The annual maintenance includes check of the temperature sensors. Clean the sensors and furthermore visual inspection of all components regarding:

- All components are still well secured.
- All hoses are still well mounted.
- No hoses and anything else are damaged.
- That all components are undamaged and clean.
- Nothing is or has been jammed by damper motors, valve motors or something else.

s. Instructions designed to enable adjustment and maintenance to be carried out safely, including the protective measures that should be taken during these operations

s.1. Protective measures and additional protective measures

Adjustment and maintenance must be done by skilled technicians – usually based on service contracts for some years or long-term ESCO contracts.
The units are provided with guards to avoid unintended hazards and injury because of rotating parts in the unit. The potential sources of harm are the fans with fast rotating impellers. Hazards from the impellers are obvious during operation, but when power is cut-off, the impellers are still potential hazards due to after-run for at least 20 seconds. Notice that even cut-off the impellers are still potential hazards.
The fan guard's are the inspection doors and the doors are provided with locks. Inside the doors are additional protection installed – guards that only can be removed by use of tools.

Other motor-driven parts are dampers with damper motors and rotary heat exchangers, but the movement is so slow that guard measures are not necessary. Just keep your hands away from places with risk of injury. Use particulate respirator when filters are replaced.

s.1.1 Necessary protection measures prior to start-up.

Ensure that all protection measures are installed correct before start-up.

s.1.1.1 Design of protection measures

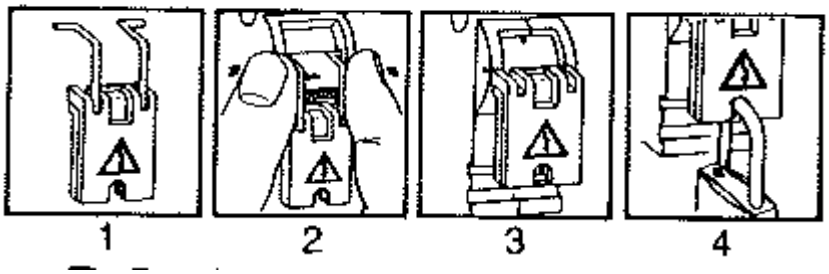
Inside the doors are additional protection installed – guards that only can be removed by use of tools.

s.1.1.2 Configuration of frequency converters with installed guard

A frequency converter is mounted beside the fan in some units. If the configuration of frequency is carried out with the fan in operation, the guard must be installed for safety reasons and a long cable must be installed between the frequency converter inside the unit and the control panel outside the unit.

s.1.2 Safe adjustment and maintenance

Before maintenance and repair, the unit must be switched off by switching off the automatic circuit breakers and block them by padlocks. The automatic circuit breakers are marked F1 to F4. See the illustration below about how to place a padlock on each automatic circuit breaker. Check that the automatic circuit breaker marked F5 is still switched on because the lamps inside the unit, and only those lamps, are connected to this switch. Switch on the lamps for light during the maintenance activities (note that the lamps are an accessory – only installed, if ordered).
Use cut-resistant gloves for protection against injury from sharp metal plate edges. Use CE-marked gloves for this purpose. Use helmet during maintenance work in the unit.



s.1.3 Personal protective equipment for maintenance staff – health and safety

Use the below-mentioned personal protective equipment for maintenance:

- Cut-resistant gloves for protection against injury from sharp metal plate edges. Use CE-marked gloves for this purpose.
- Helmet
- Particulate respirator – maintenance free including foam face-seal and adjustable pre-threaded headbands – for replacing filters.
- Padlock for locking the above mentioned automatic circuit breakers.
- Permanent magnet motor. The shaft must be blocked during repairs and maintenance of the electric system (the motor generates electricity by rotation – for example that the wind and thermic drives the fan/motor).

t. The specifications of the spare parts to be used, when these affect the health and safety of operators

DV and TIME units are operating automatically. Operators can control the unit by the Systemair control panel.

t.1 Spare parts - Mechanical

Mentioned above

t.2 Spare parts - Electrical

Mentioned above

u. Information on airborne noise emissions exceeding 70 dB(A)

Due to the design and construction of the units the (A) weighed sound pressure level from fans and other components do not exceed 70 dB (A) outside the units.

Annex 1 Declaration of conformity with unique production number.

Printed on separate page and delivered with every unit

Annex 2 Technical data – unique data for every unit

Printed on separate pages and delivered with every unit

Annex 3 spare part lists

Printed on separate pages but **not** delivered with every unit. Available on demand.

Annex 4 – 12 are printed as a separate manual as supplement to this User manual

Annex 4 Assemble base frames – height 150 mm for units in the sizes 10-40
Annex 5 Assemble base frames – height 150 mm for units in the sizes 50-150
Annex 6 Assemble base frames – height 250 mm for units in the sizes 10-40
Annex 7 Assemble base frames – height 250 mm for units in the sizes 50-150
Annex 8 Installation of steel roof in the sizes 10-150
Annex 9 Rotary exchanger – speed control and assembly of divided rotor
Annex 10 Internal controller in the cooling compressor units – DVU and DVU-C
Annex 11 Menu for internal controller in the cooling compressor units - DVU and DVU-C
Annex 12 Connection of fan motor and set-up manual for Danfoss VLT FC101 frequency converter

Annex 13 Commissioning protocol – proposal (receipt for hand-over)

Printed on separate pages and delivered with every unit

Annex 14 Report with data from the final functional test on the Systemair factory

Printed on separate pages and delivered with every unit

Annex 15 Short description of main components in control system

Annex 16 Wiring diagram

Printed on separate pages and delivered with every unit

Annex 17 Operator's guide (how to use the Systemair control panel)

A separate manual on 12 pages delivered with every unit. This manual assists the everyday user/operator about how to control the unit by navigating the menus by the buttons and the display.

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